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# THE ARMY OFFICER'S EXAMINER.

CONTAINING  
QUESTIONS AND ANSWERS  
ON ALL SUBJECTS PRESCRIBED FOR AN OFFICER'S EXAMINATION;  
TOGETHER WITH  
RULES TO GUIDE BOARDS OF EXAMINATION.

BY LIEUT.-COL. WM. H. POWELL,  
*11th Infantry, U. S. Army.*



NEW YORK:  
JOHN WILEY & SONS,  
53 EAST TENTH STREET.  
1894.

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WM. H. POWELL.



## PREFACE.

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THE object of this work is to equalize the examinations of officers by boards and to relieve the War Department of the trouble of preparing sample questions, each subject being exhausted with questions and fair approximate answers given to each, furnishing thereby a guide to both boards and candidates, as well as data to refresh their memories for those who have passed the periods of examination.

It will be found to be an invaluable aid to officers of the National Guard in the pursuit of knowledge in the military service.

The work has been prepared with great labor, and the subscriber has received the valuable assistance in its preparation of Lieut.-Col. J. W. Clous, Judge Advocate, Professor of Military Law at the U. S. Military Academy, in Military Law ; Major S. C. Norvell, 10th Cavalry, in Cavalry Drill ; First Lieut. Thos. J. Lewis, 2d Cavalry, in Hippology ; First Lieut. Wallis O. Clark, 12th Infantry (distinguished marksman), in Fire Discipline ; and Second Lieut. Wm. H. Reynolds, 14th Infantry, in Military Topography—to all of whom he returns his sincere thanks.

WM. H. POWELL.

NEW YORK CITY, 1894.

1. The first part of the report is a general  
description of the project and its objectives.  
2. The second part is a detailed description of  
the methodology used in the study.  
3. The third part is a description of the results  
of the study.  
4. The fourth part is a discussion of the results  
and their implications.  
5. The fifth part is a conclusion and a list of  
references.





## BOARDS OF EXAMINATION.

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Boards for the examination of all officers of the army as to their physical and mental qualification were instituted by the following Act of Congress :

### ACT OF CONGRESS DIRECTING EXAMINATIONS FOR PROMOTION.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That hereafter, promotion to every grade in the Army below the rank of brigadier-general, throughout each arm, corps, or department of the service, shall, subject to the examination hereafter provided for, be made according to seniority in the next lower grade of that arm, corps, or department : *Provided*, That in the line of the Army all officers now above the grade of second lieutenant shall, subject to such examination, be entitled to promotion in accordance with existing laws and regulations.

SEC. 2. That officers of \* grades in each arm of the service shall be assigned to regiments, and transferred from one regiment to another, as the interests of the service may require, by orders from the War Department, and hereafter all appointments in the line of the Army shall be by commission in an arm of the service and not by commission in any particular regiment.

SEC. 3. That the President be, and he is hereby, authorized to prescribe a system of examination of all officers of the Army below the rank of major to determine their fitness for promotion, and such an examination to be conducted at such times anterior to the accruing of the right to promotion as may be best for the interests of the service : *Provided*, That the President may waive the examination for promotion to any grade in the case of any officer who, in pursuance of existing law, has passed a satisfactory examination for such grade prior to the passage of this act : *And provided*, That if any officer fails to pass a satisfactory examination and is reported unfit for promotion, the officer next below him in rank, having passed said examination, shall receive the promotion : *And provided*, That should the officer fail in his physical examination and be found incapacitated for service by reason of physical disability contracted in line of duty, he shall be retired with the rank to which his seniority entitled him to be promoted; but if he should fail for any other reason, he shall be suspended from promotion for one year, when he shall be re-examined, and in case of failure on such re-examination he shall be honorably discharged with one year's pay from the Army : *And provided further*, That the examination of officers appointed in the Army from civil life, or of officers who were officers of volunteers only, or were officers of the militia of the several States called into service of the United States, or were enlisted men in the regular or volunteer service, either in the Army, Navy, or Marine Corps, during the War of the Rebellion, shall be conducted by boards composed entirely of officers who were appointed from civil life or of officers who were officers of volunteers only during said war, and such examination shall relate to fitness for practical service and not to technical and scientific knowledge ; and in case of failure of any such officer on the re-

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\* Sic in the roll.

examination hereinbefore provided for, he shall be placed upon the retired list of the Army; and no act now in force shall be so construed as to limit or restrict the retirement of officers as herein provided for.

Approved, October 1, 1890.

BY COMMAND OF MAJOR-GENERAL SCHOFIELD:

CHAUNCY MCKEEVER,

*Acting Adjutant-General.*

Upon the approval of this act, and as soon as the rules prescribed could be prepared, the following order was issued:

GENERAL ORDERS, }

No. 128.

HEADQUARTERS OF THE ARMY,  
ADJUTANT-GENERAL'S OFFICE,  
*Washington, October 29, 1890.*

The following rules, prescribed by the President, in accordance with Section 3 of the Act of Congress approved October 1, 1890, providing for a system of examination to determine the fitness for promotion of all officers of the Army below a certain grade, are, by direction of the Secretary of War, published for the information and guidance of all concerned:

I. At such time, anterior to the accruing of the right to promotion, as may be best for the interests of the service, officers of the line of the Army and of the Quartermaster's and Subsistence Departments below the rank of major shall be examined by a board, convened by the War Department, consisting of five members, two of whom shall be selected from the Medical Corps, and a recorder. The board, excepting the officers of the Medical Corps, shall be composed of officers senior in rank to the officers to be examined, and, as far as practicable, of the arm of service or department to which the officer belongs. The duties of the medical officers will be confined to the physical examination.

II. Examination shall be made under the following heads:

1. Physical condition.

2. Character and professional efficiency.

III. When the board finds an officer physically incapacitated for service it shall conclude the examination by finding and reporting the cause which, in its judgment, has produced his disability, and whether such disability was contracted in the line of duty. For the purpose of this inquiry the proceedings of the board shall conform to those of a retiring board.

IV. When the board finds an officer physically capable, the examination shall proceed under the second head. Any evidence submitted as to character will be carefully considered, and such proceedings taken as, in the opinion of the board, the case requires; provided, that an adverse finding shall not be entered until the officer shall have been fully heard in his own behalf.

V. The examination in respect to professional proficiency shall relate to fitness for practicable service, and to apply to all officers enumerated in paragraph I. For the present it shall embrace such subjects as pertain to the actual practical working of the arm of the service or department to which the officer belongs, viz.: drill regulations, authorized manuals of instruction, army regulations, military law so far as it relates to practice and procedure before courts-martial, records, returns, correspondence, and administration; and due consideration will be given to the officer's record for professional efficiency, including his standing at the service schools.

Any individual investigations, papers, reports, or books may be submitted to the board by the officer, and the board is authorized to consider any matter which will, in its judgment, aid it in determining the fitness of the officer for promotion.

VI. Subsequently to a date to be announced hereafter, but not less than eighteen months hence, the scope of examination for officers of the line will be extended. To this end officers should make themselves familiar with the elements of Field Engineering and the Art of War, so far as they relate to fitness for practical service. The authorities on these subjects included in the curriculum of the Artillery School at Fort Monroe and of the Infantry and Cavalry School at Fort Leavenworth are regarded as standard. The result of special inquiries involving studies of professional subjects will be received and considered as equivalents of the above-mentioned subjects, so far as in the opinion of the board their merits justify.

VII. The examination of the following officers shall be conducted by boards

composed entirely of officers who were appointed from civil life or who were officers of volunteers only, during the War of the Rebellion:

1. Officers appointed in the Army from civil life during the War of the Rebellion.

2. Officers who were officers of volunteers only during the War of the Rebellion.

3. Officers who were officers of militia of the several States called into the service of the United States during the War of the Rebellion.

4. Officers who were enlisted men in the Regular or Volunteer Service, either in the Army, Navy, or Marine Corps, during the War of the Rebellion.

The examination of the following officers may be conducted by boards organized at the discretion of the War Department, to be composed, as far as practicable, of officers of the same professional antecedents as the officers to be examined:

1. Graduates of the Military Academy.

2. Officers appointed from civil life since the War of the Rebellion.

3. Officers appointed from the Army since the War of the Rebellion.

The expression "during the War of the Rebellion" is understood to embrace the period between April 15, 1861, and May 1, 1865.

VIII. Officers of the Medical Department, Corps of Engineers, and Ordnance Department, below the grade of major, shall be examined for promotion as hereinbefore provided, excepting that the examination as to professional efficiency shall be conducted as heretofore authorized by orders and regulations pertaining to the department and corps referred to, or as may hereafter be specially prescribed therefor.

Two medical officers will be added to the board as now authorized, for the examination of engineer and ordnance officers, whose duties shall be confined to the physical examination.

Officers who, in pursuance of existing law, have passed a satisfactory examination for any grade, prior to the passage of the act approved October 1, 1890, will not be required to undergo the examination above mentioned, unless specially ordered by the President.

IX. Any officer heretofore reported by a retiring board as incapacitated by reason of physical disability, the result of an incident of service, shall, if the proceedings of said board are approved by the President, be regarded as physically unfit for promotion within the meaning of Section 3 of the Act of October 1, 1890, and will be retired with the rank to which his seniority entitles him whenever a vacancy occurs that otherwise would result in his promotion on the active list; provided, that before the occurrence of such vacancy he shall not have been placed on the limited retired list; and further provided, that any officer who objects to retirement under the provisions of this paragraph shall, upon his own application, be re-examined under the general provisions of this order.

X. The examining board shall report its recommendation of any officer for promotion in substantially the following form:

"We find that ——— has the physical, moral, and professional qualifications to perform efficiently all the duties of the grade to which he will next be eligible, and recommend him for promotion thereto."

Each record must be signed by every member and by the recorder, and must show who of the members concurred in and who, if any, dissented from the opinion of the board.

Whenever the board fails to recommend a candidate for promotion, the record will state the cause of such failure.

The proceedings shall be forwarded to the Adjutant-General of the Army for the final action of the Secretary of War.

BY COMMAND OF MAJOR-GENERAL SCHOFIELD:

CHAUNCEY MCKEEVER,

*Acting Adjutant-General.*



## RULES OF PROCEDURE.

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WHEN the officers who are ordered to appear before the board report to the president thereof (*which they are invariably directed to do in orders*), the president, through the recorder, notifies the medical members of the board of their presence, and requests to know when the physical examination can be made.

As soon as the fact is ascertained, the officers to be examined are directed to report to the senior surgeon, who will, upon completion of the physical examination, transmit to the recorder a written certificate giving the condition of the officer, signed by both medical officers.

A certificate will be required from the examined officer at the commencement of the physical examination that, to the best of his knowledge and belief, he is not affected with any form of disease or disability. (See Circular from Surgeon-General's Office, by order of the Secretary of War, Dec. 18, 1890.)

Upon the receipt of the certificates, the president will direct the recorder to convene the board at an appointed time, and the recorder notifies the candidate for examination to be present; or, if preferable the entire board can be convened before the examination by the medical officers, and the physical examination made during a recess of the board, taken for that purpose.

The members, recorder, and officers to be examined assemble at the place and hour designated, and the board will be called to order by the president, who will direct the order convening the board to be read.

After this the order directing the candidate to appear will be read, and the candidate will be asked if he has any objection to his examination by any member present.\*

[*If the officer should object, his objection will be made in writing; and after consideration by the board, and its opinion given, will be forwarded to the War Department for action in the matter.*]

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\* The right of challenge should always be accorded. The statutes as to the formation of a retiring-board intend a fair hearing, and without this right great injustice might at times result.—*Ives*.

At this point the officer should ask to introduce counsel, if he desires so to do.

If the candidate has no objections to any of the members, the recorder will then administer the following oath:

*"You (A. B.) do swear that you will honestly and impartially discharge your duties as a member of this board in the matter now before you. So help you God."*

After which the president of the board will administer the following oath to the recorder:

*"You (A. B.) do swear that you will, according to your best abilities, accurately and impartially record the proceedings of the board, and the evidence to be given in the case in hearing. So help you God."*

The board is now organized in the full capacity of a Retiring-board, and if there is anything found in the medical examination which is likely to render the officer unfit for promotion, all other candidates but the one in question will withdraw from the board, and a further examination of the case will be continued.

The examination of witnesses is next in order, and, when called before the board, the following oath will be administered by the recorder:

*"You (A. B.) do swear that the evidence you give in the cause now in hearing shall be the truth, the whole truth, and nothing but the truth. So help you God."*

The first witnesses (in case of disability) are the medical officers, and they present the written certificate which they have made, and reply to any oral questions propounded by the board, all of which must be made a matter of record.

NOTE.—A retiring-board has to inquire into and determine the facts touching the nature and occasion of the disability of any officer who appears to be incapable of performing the duties of his office, and has such powers of a court-martial and of a court of inquiry as may be necessary for that purpose. The board, therefore, has power to summon and compel the attendance of witnesses, and to make use of depositions in the same manner and under the same restrictions as courts-martial.—*Ives*.

Other oral testimony and documentary evidence may then be introduced, with the right to the candidate of objecting to any improper evidence, and of cross-examining the witnesses called by the board.

The candidate can then produce such evidence as he may deem necessary in the case.

When this has all been received, should the board desire, it may call upon the Adjutant-General of the Army for the complete history of the officer; in which case, or in the event of a delay granted the officer, the board adjourns to meet at the call of the president, or proceeds to other business.

When all the papers relating to the case have been received by the recorder, the president will call the board together, and each individual paper, duly attested, will be read in the presence of

the officer under examination, briefed on the record and referred to as appended, and marked A, B, or C, as the case may be.

After all the evidence has been duly entered, the board will sit with closed doors (*which it has a right to do at any time for deliberation, but not for the taking of testimony*), and the decision at which it arrives is entered upon the record, signed by the *president and recorder only*, if the officer is found incapacitated for active duty.

NOTE.—The province of a retiring-board is simply to determine the facts touching the nature and occasion of the disability of the officers examined. It has no authority to entertain any charge of a military offence, or to try an issue of fact involving the moral status of the officer. Its deliberations must be directed to his physical and mental capacity to discharge the duties incident to his rank and office; and its investigation is not limited to any particular period of time; for the length of service of an officer and the duration and continuance of his disability are all material to be considered.—*Ives*.

The finding of the board must be considered as *confidential*.

The board is required to give an opinion as to whether the invalid officer is incapacitated for active service or not. When it finds an officer so incapacitated, it is further required to report the cause which, in its judgment, has produced his incapacity, and whether such cause resulted from an incident of service.

This conclusion of the board is merely to assist the President of the United States in deciding the case.



## PROCEDURE WHEN FOUND NOT INCAPACITATED.

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If the officer examined has been reported as physically capable of discharging the duties of the next higher grade to which he is eligible, the certificates of the surgeons will be read to the board immediately after the oaths have been administered to the members and the recorder, and the board determines whether it will so find the officer or otherwise. If found capacitated for duty, the medical members will then be relieved from further attendance in the case.

The remaining members then become a board of examination as to professional efficiency and proceed, as prescribed in General Orders No. 128, series of 1890, from the headquarters of the Army, amended by the following order:

GENERAL ORDERS, {	HEADQUARTERS OF THE ARMY,
No. 80.	ADJUTANT-GENERAL'S OFFICE,
	Washington, October 5, 1891.

The following rules prescribed by the President, in accordance with section 3 of the act of Congress approved October 1, 1890, providing for a system of examination to determine the fitness for promotion of all officers of the Army below a certain grade, are, by direction of the Secretary of War, published for the information and guidance of all concerned:

I. After January 1, 1893, the scope of examination for officers of the line will be as follows:

First.—*For promotion from second to first lieutenant.*

Manual of guard duty.

Military law.

Elements of field engineering.

Signalling.

Drill regulations (candidate's arm only).

Manuals of instruction:

Cavalry—

Hippology.

Artillery—  
Exterior ballistics.  
Infantry—  
Fire discipline.  
Minor tactics.  
Small-arms firing regulations (cavalry and infantry only).  
Administration.

Second.—*For promotion from first lieutenant to captain.*

Military law.  
Elements of field engineering.  
Signalling.  
Drill regulations (candidate's arm only).  
Manuals of instruction, as prescribed for second lieutenants.  
Minor tactics.  
Military topography.  
Small-arms firing regulations (cavalry and infantry only).  
Administration.

Third.—*For promotion from captain to major.*

Military law.  
Drill regulations (candidate's arm only).  
Minor tactics.  
Administration.

Essay of not less than 3000 words upon a professional topic, selected by the candidate, and submitted to the Adjutant-General for the approval of the Major-General Commanding the Army. The essay to be prepared at any time during the three months immediately preceding the examination, the date of which will be communicated by the Adjutant-General.

Fourth. First and second lieutenants of artillery, serving with light batteries at the time of examination, will be examined in hippology as prescribed for cavalry.

Fifth. Examinations conducted in conformity with the Memorandum of October 5, 1891, from this office, will, for the purpose of marking, be divided into two parts, as follows:

1. To each written question a numerical value will be attached, and the board will credit each answer according to its nature.
2. To each exercise in parade examination, and the attending oral questions if any are propounded, the board will in like manner allot a numerical value, and credit each test according to its merit. In subjects exclusively or almost entirely oral, such as small-arms firing regulations and administration, a numerical value will be given each subject, and a credit given on the general result of all the answers therein.

No candidate will be passed who shall not obtain an average of 60 per cent in all the written questions propounded; and an



average of 70 per cent in parade and oral examinations considered collectively.

Sixth. Graduating diplomas of the Infantry and Cavalry School, and the Artillery School, dated not more than five years anterior to examination, shall be accepted as sufficient evidence of proficiency in subjects enumerated therein.

\* \* \* \* \*

BY COMMAND OF MAJOR-GENERAL SCHOFIELD:

J. C. KELTON,

*Adjutant-General.*

The professional examination defined in the above-quoted order will therefore, after January 1, 1893, be conducted as prescribed in the following

### MEMORANDUM.

*SUBHEADS FOR THE WRITTEN EXAMINATION OF OFFICERS FOR PROMOTION AS PRESCRIBED IN GENERAL ORDERS, NO. 128, OCTOBER 29, 1890, AND NO. 80, OCTOBER 5, 1891, FROM THE ADJUTANT-GENERAL'S OFFICE; GENERAL INSTRUCTIONS FOR PARADE AND ORAL EXAMINATIONS, AND TEXT-BOOKS AND AUTHORITIES.*

#### SUBHEADS FOR THE WRITTEN EXAMINATION.

##### For 2d Lieutenants of the Line.

##### MANUAL OF GUARD DUTY.

###### Rosters.

The officer of the day.

The officer of the guard.

The sergeant of the guard.

The corporal of the guard.

The soldier on guard.

Orders for sentinels on post (paragraph 169 to 233)

Miscellaneous (paragraphs 234 to 242).

Artillery-stable and park-guard.

Miscellaneous subjects (paragraphs 278 to 360).



##### MILITARY LAW.

The subject defined and divided ; constitutional provisions.

The written military law.

The unwritten military law.

The court-martial.

The constitution and composition of general courts-martial.

The jurisdiction of general courts-martial.

#### **xiv PROCEDURE WHEN FOUND NOT INCAPACITATED.**

The procedure of general courts-martial ; arrest.

The charge.

Assembling and opening of the court; the president and members.

The judge advocate.

Challenges.

Organization, arraignment, pleas and motions.

The trial.

Evidence.

The finding.

Sentence and punishment.

Action on the proceedings; the reviewing authority.

Inferior courts-martial.

The court of inquiry.

The summary court—General Orders, 117 and 137, 1890, and Circulars 1, 2, 5, and 9, 1891, Headquarters of the Army.

Punishment—General Orders, 117, 1890, and General Orders, 21, 1891, Headquarters of the Army.

#### **ELEMENTARY FIELD ENGINEERING.**

General principles and definitions.

Clearing the ground.

Hasty entrenchments.

Obstacles.

Defense of posts.

Field level and field geometry.

Deliberate entrenchments.

Field casemates.

Brushwood.

Revetments.

Working-parties.

Siege trenches.

Roads.

Cordage and use of spars.

Bridges.

Floating bridges.

Camping arrangements.

Hasty demolition.

#### **SIGNALLING.**

##### **THEORETICAL.**

United States Signal and Telegraph Code, authorized by General Orders, No. 59, Headquarters of the Army, 1889, copies of which can be obtained upon application to the Chief Signal Officer of the Army.

PRACTICAL.

Transmission of simple messages with flag, at distances not less than one mile, using authorized code.

DRILL REGULATIONS.

FOR CAVALRY.

Definitions, signals, general principles.  
School of the soldier.  
School of the troop.  
School of the squadron.  
Extended order (to include the squadron).  
Employment of cavalry.  
Raids, escorts, escorts to convoys.  
Scouting and reconnoitring.  
Advance and rear guards.  
Outposts, marches, camping.  
Stable-duty.  
Cavalry horses.  
Packing.

FOR ARTILLERY.

LIGHT ARTILLERY.

School of the soldier (dismounted).  
Squad drill.  
School of the cannoneer.  
School of the battery (dismounted).  
Horse artillery.  
School of the driver.  
School of the battery.  
Organization of artillery.  
Artillery in the field.  
Artificial cover.  
Camping.  
Transportation of artillery.  
Artillery horses.  
Stables.



HEAVY ARTILLERY.

[Tidball's Manual.]

Preliminary instruction.  
Service of the piece.  
Mechanical manœuvres.  
Care and preservation of artillery material.  
Transportation of artillery.  
Harbor defenses.

## xvi PROCEDURE WHEN FOUND NOT INCAPACITATED.

Attack and defense of positions.

General Orders, No. 108, of 1888, Headquarters of the Army.

General Orders, No. 132, of 1890, Headquarters of the Army.

### FOR INFANTRY.

Definitions, signals, general principles.

School of the soldier.

School of the company.

School of the battalion.

Extended order (to include the battalion).

Advance and rear guards.

Marching, camping.

### MANUALS OF INSTRUCTION.

#### FOR CAVALRY.

##### *HIPPOLOGY.*

#### HORSES AND STABLES.

Ventilation and construction of stables.

Improvement of stables of faulty construction.

Stable-fittings.

Watering and feeding.

Characteristics of good oats.

Various defects in oats.

Distinction between old and new oats.

Upland, lowland, and water-meadow hay, and distinctions between the same.

Characteristics of good upland hay.

Grooming.

Exercise.

Stable-management.

Conformation.

Principles of shoeing.

Details of shoeing.

#### SEATS AND SADDLES.

The framework of the horse considered from a mechanical point of view.

The saddle, and its influence on the seat.

Seats.

The military seat.

#### BITS AND BITTING.

General principles.

The neck, the head, the mouth, the tongue, carriage, feeling.

The cavesson, snaffle, nose-band, training-halter, running-reins.

## PROCEDURE WHEN FOUND NOT INCAPACITATED. xvii

The lever, the bit and curb, the bridle.

Taking measure for the bit—the mouth-gauge, the trial-bit.

### RESTIVENESS.

How to render horses obedient.

General rules for the treatment of restiveness.

Special forms of restiveness.

### FOR ARTILLERY.

#### EXTERIOR BALLISTICS.

Introduction and not less than three problems selected indiscriminately from Captain Ingalls' "Handbook of Problems in Exterior Ballistics."

### FOR INFANTRY.

#### FIRE DISCIPLINE.

The trajectory.

Variations in the trajectory.

Mean and practical trajectory.

Limit of individual fire.

Controlled fire and combined sights.

Effects of collective fire.

Influence of ground.

Long-range fire.

Direction and control of fire.

Kinds of fire.

The fire unit.

Supply of ammunition.

Rapidity of fire.

Tactical deductions.

Indirect and plunging fire, etc.



### MINOR TACTICS.

Security and information.

Reconnoitring.

#### For 1st Lieutenants of the Line.

Military law.

Elements of field engineering.

Signalling.

Manuals of instruction.

} Same as for 2d lieutenants.

## **xviii PROCEDURE WHEN FOUND NOT INCAPACITATED.**

### **DRILL REGULATIONS.**

The same as for 2d lieutenants, with the addition of evolutions of the regiment, and "The Regiment" in extended-order drill, for infantry and cavalry; the school of the battalion for artillery.

### **MINOR TACTICS.**

General principles and definitions.

Functions of the three arms.

Security and information.

Reconnoitering.

Rear-guards.

Convoys.

### **MILITARY TOPOGRAPHY.**

Construction of scales; copying, reducing, and enlarging plans; the conventional signs.

Terms used in describing hills; the representation of hills; the scale of horizontal equivalents.

Sections.

Making use of plans on the ground; measurement of distance; the plane-table illustrated in intersection and resection.

The prismatic compass and the protractor; their uses illustrated in intersection and resection; the magnetic variation.

Traversing with compass and field-book; plotting; traversing and plotting at sight.

Traversing with the plane-table.

Hill and mountain sketching.

Sketching without instruments; general remarks on sketching.

Reading contoured plans.

Reconnaissance of a defensive position; sketch and report.

Sketching on horseback.

Laying out and constructing roads.

### **For Captains of the Line.**

### **MILITARY LAW.**

Instructions for the government of armies of the United States in the field.

The law of war.

Civil functions and relations of the military.

### **DRILL REGULATIONS.**

The same as for a 1st lieutenant, with the addition according to arm, of the omitted portions of the cavalry, light artillery, and infantry drill books.

MINOR TACTICS.

General principles and definitions.  
Functions of the three arms.  
Security and information.  
Reconnoitering.  
Attack and defense of infantry.  
Attack and defense of cavalry.  
Attack and defense of the three arms.  
Rear-guards.  
Convoys.

ESSAY.

As prescribed in General Orders, No. 80, Headquarters of the Army, 1891.

For Captains of Quartermaster's Department.

MILITARY LAW.

(Same as for captains of the line.)

HIPPOLOGY.

HORSES AND STABLES.

(Same as for cavalry.)

DRAUGHT AND HARNESS.

The angle of traction.  
The collar.  
The harness.  
The trace.  
The pole and pole-chains.  
The height of the wheel.  
Training for draught.



ARMY REGULATIONS.

Article 56. Advertising and printing.  
Article 57. Contracts and purchases.  
Article 58. Money accountability.  
Article 59. Property accountability.  
Article 60. Boards of survey.  
Article 62. Staff administration.  
Article 78. Quartermaster's Department.

## **XX PROCEDURE WHEN FOUND NOT INCAPACITATED.**

Blanks should be furnished and candidates required to make an account current and a return of stores, accompanied by vouchers calculated to exemplify the use of the most important blanks pertaining to the department. Contracts of various kinds should be made, bonds executed, and general procedure in connection therewith described.

### **For Captains of Subsistence Department.**

#### **MILITARY LAW.**

(Same as for captains of the line.)

#### **ARMY REGULATIONS.**

(Same as for the Quartermaster's Department, substituting paragraph 79 in place of 78.)

### **GENERAL INSTRUCTIONS FOR PARADE AND ORAL EXAMINATIONS.**

In addition to the theoretical written examination, the knowledge of each candidate will be tested in drills, mechanical manœuvres, and such other practical work as may be deemed expedient by the board.

1st and 2d lieutenants will be examined on the parade in actual command of troops in the school of the soldier and the school of the troop, battery, or company, according to arm, and, in the case of cavalry and artillery, dismounted and mounted. The candidate will act as instructor, and, in addition to giving the words of command, will be required to give the explanation of each movement before it is performed. The exercises will cover the entire scope of the drill-book pertaining to the candidate's own arm in regard to the subjects mentioned, and will embrace the primary drill of unarmed recruits sabre-exercises, bayonet-exercise, and extended-order drill.

In the artillery the board will, if the material is available, satisfy itself that the candidate is able to conduct the mechanical manœuvres of a light battery, and to mount and dismount at least one gun employed in seacoast defense.

Captains will in like manner be examined on the parade in the school of the troop, battery, or company, including extended-order drill of cavalry and infantry, and the school of the battalion or squadron, according to arm.

In connection with parade examinations and mechanical ma-



nœuvres, oral questions may be propounded at the discretion of the board.

Cavalry and infantry 1st and 2d lieutenants will practically exemplify, in such manner as may be prescribed by the board, their method of instruction in small-arms firing, and also be orally interrogated in the regulations thereof, at the discretion of the board.

The board will enumerate in the record of proceedings the exercises performed in pursuance of the foregoing requirements, and will state clearly whether the candidate is able to impart instruction in an effective manner ; especially 1st and 2d lieutenants, to recruits, in the school of the soldier and in target-practice.

1st and 2d lieutenants will be examined orally, at the discretion of the board, in regard to the interior economy and administration of a troop, battery, or company. The system of keeping books, making returns, messing, company-fund, and such other matters as the subject suggests, should be inquired of.

Captains will be examined in like manner in regard to their respective organizations, and also in regard to regimental and post administration.

Oral questions shall be embodied in the proceedings of boards only in the event of a candidate being pronounced deficient in consequence thereof ; otherwise a simple statement that the candidate was questioned as required, made a certain percentage, and was found proficient, is sufficient to make of record.

Commanding officers of posts whereat boards are convened, or in the vicinity thereof, will be advised to comply, as far as possible, with requests for troops and material.

All the officers of the board are invariably to be present during parade and oral examinations.

#### TEXT-BOOKS AND AUTHORITIES.

##### Military Law :

For 1st and 2d lieutenants, Winthrop's Abridgment Military Law.

For captains, General Orders, No. 100, April 24, 1863, War Department, Adjutant-General's Office.

Parts II and III, Winthrop's Unabridged Military Law.

Field engineering.

Hippology.

Horses and stables.

Seats and saddles, etc.

Draught and harness.

Minor tactics.

Military topography.

} Authorized text-books in use at the Infantry and Cavalry School, which can be obtained through the secretary of the School at Fort Leavenworth, Kansas.

Authorized text-books—Infantry Fire: its Use in Battle, by Lieutenant J. B. Batchelor, Jr., Twenty-fourth Infantry; Infantry Fire Tactics, edition 1888, by Major C. B. Mayne.

G. O. 6, H. Q. A., Jan. 26.

The following rules prescribed by the President, in accordance with Section 3 of the Act of Congress approved Oct. 1, 1890, providing for a system of examination to determine the fitness for promotion of all officers of the Army below a certain grade, are, by direction of the Secretary of War, published for the information and guidance of all concerned:

I. The first section of paragraph 1, G. O. 80, Oct. 5, 1891, this office, is amended to read as follows:

*First.—For promotion from 2d to 1st lieutenant.*

Manual of guard duty.

Military law.

Elements of field engineering.

Signalling.

Drill regulations (candidate's arm only).

Manuals of instructions:

Cavalry—Hippology.

Artillery—Exterior ballistics and miscellaneous questions in artillery.

Infantry—Fire discipline.

Minor tactics.

Small-arms firing regulations (cavalry and infantry only).

Administration.

As the miscellaneous artillery examination does not admit of ready classification under specific subheads, a list of the questions, with reference to the various sources from which compiled, will be prepared for distribution to officers concerned.

II. In addition to subjects heretofore prescribed, the written examination of all officers of the line will embrace Regulations for the Army of the United States relating to troops in campaign.

III. The relative weights of the subjects embraced in examinations will be as follows:

#### I. THEORETICAL.

1. Manual of guard duty.....	2
2. Military law.....	2
3. Field engineering.....	3
4. Signalling.....	1
5. Drill regulations.....	3

6. Hippology.....	3
7. Exterior ballistics and miscellaneous questions in artillery.	3
8. Fire discipline.....	3
9. Minor tactics.....	4
10. Military topography.....	3
11. Essay.....	2
12. Army regulations.....	2
13. Troops in campaign.....	2

## II. PARADE AND ORAL.

1. Drill.....	4
2. Signalling.....	1
3. Small-arms firing regulations.....	3
4. Administration.....	1
5. Mechanical manœuvres.....	4

IV. A summary of the examination will be embraced in the record of proceedings in each case, according to the following form :

Summary of examination of.....

## THEORETICAL.

Subject.	Aggregate Value of Questions.	Aggregate of Marks Given.	Percentage.	Relative Weight of Subject.	Product.
1. Manual of guard duty.....	150	134	89	2	178
2. Military law.....	250	175	70	2	140
3. Field engineering.....	250	165	66	3	198
4. Signalling.....	100	71	71	1	71
5. Drill regulations.....	250	238	95	3	285
6. Hippology.....	250	140	56	3	168
7. Exterior ballistics and miscellaneous questions in artillery.	200	100	50	3	150
8. Fire discipline.....	300	180	60	3	180
9. Minor tactics.....	300	180	60	4	240
10. Military topography.....	250	152	64	3	192
11. Essay.....	100	85	85	2	170
12. Army Regulations.....	150	135	90	2	180
13. Troops in campaign.....	100	94	94	2	188
				33	2340
					70.9

# xxiv PROCEDURE WHEN FOUND NOT INCAPACITATED.

## PARADE AND ORAL.

Subject.	Numerical Value of Subject.	Percentage.	Relative Weight of Subject.	Product.
1. Drill.....	100	88	4	352
2. Signalling.....	100	85	1	85
3. Small-arms firing regulations.....	100	76	3	228
4. Administration.....	100	95	1	95
5. Mechanical manœuvres.....	100	70	4	280
			13	1040
General average.....	.....	.....	.....	80

By command of Maj.-Gen. Schofield :

R. WILLIAMS.  
*Adjutant-General.*

The number of questions on each subject for which the examination is required is governed by instructions to the board from the War Department.

Officers under examination, collectively, are not to discuss among themselves the questions propounded, nor consult any books or papers bearing upon the examination.

At least one member of the board is invariably to be present while the written examination is going on.

The usual method of conducting the examination is for the president of the board to apportion the subjects, and each to prepare the questions thereon, and then submit all to the examiners as a board for approval. When approved, each member may take the individual or class (the latter preferable if officers of the same rank can be assembled together) and pursue the examination on the subjects assigned to him, thus relieving each other until the examination is completed, when all the examining members will assemble, read the answers furnished, and determine the merits thereof.

At such time as the board may determine, the knowledge of each candidate will be tested in drills, by requiring him to act as instructor in actual command of troops, the exercises to cover the entire scope of the drill-book, the school of the company, and company and battalion in extended order for lieutenants, and all else in the drill regulations for captains.

The proceedings will be signed only by the three members constituting the examining board.

A positive finding by the board must invariably be made, in substantially the terms expressed in Part X of G. O. No. 128—with, of course, any remarks the board may consider necessary to make to explain its action, as follows:

“We find that ——— has the physical, moral, and professional qualifications to perform efficiently all the duties of the grade to which he will next be eligible, and recommend him for promotion thereto.”

*Other findings* would necessarily contain the words “has” or “has not” the, etc., with reasons explaining the finding of the board.

If *anything* should arise during the examination which would indicate to the board a necessity for investigation, and which might require the introduction of evidence, the entire board should be called together, and the inquiry should proceed upon written interrogatories as far as possible, the board determining to whom questions shall be forwarded (such as the colonel of the officers’ regiment, his post or company commander, etc.).

When in the opinion of the board it becomes necessary to take oral testimony, the fact should be reported to the War Department for the necessary orders in regard to witnesses to be summoned from a distance.

In making up the record, after the theoretical examination has begun, it is *not* necessary to state that each day the board adjourned. All that is necessary is as follows:

“The board then proceeded with the theoretical and practical examination of ———, and continued from day to day until concluded. The written questions and answers are hereto appended and marked” A, B, etc.

## REMARKS ON FINDINGS.

If examination papers submitted by a candidate do not in themselves justify a favorable finding, and it is considered essential to examine an officer’s record for professional efficiency, as exemplified by past services, in accordance with paragraph 5, General Orders No. 128, of 1890, from the Adjutant-General’s Office at Washington, inquiry should be made by interrogatories, as authorized in the preceding paragraph. The scope of inquiry should be such as to secure a full statement of accomplished work, together with an estimate of commanding officers as to practical professional qualifications.

Questions as to matters of opinion should not be proposed to any officer junior in rank to the candidate.

If the fact is established by evidence that the officer has discharged all duties with fidelity, intelligence, and zeal, great weight may be given thereto. In formulating findings in such cases the board should, in the first instance, express its views on

## XXVI PROCEDURE WHEN FOUND NOT INCAPACITATED.

the merits of the examination papers, and enter such recommendation as may seem expedient in the light of the whole record. Whenever a favorable recommendation is made in cases wherein the written answers to questions propounded do not show requisite qualifications for promotion, the reasons therefor should be specifically set forth.

### REMARKS UPON THE ACTION OF BOARDS.

The law does not contemplate that a board shall make its finding directly contrary to the evidence of the written examination. All examinations should be so conducted as to satisfy the board by the answers furnished that the candidate is sufficiently well informed in his profession as to merit his promotion. Otherwise the law becomes inoperative.

That portion of the law which provides "*That if any officer fails to pass a satisfactory examination, and is reported unfit for promotion, the officer next below him in rank, having passed said examination, shall receive the promotion,*" would be a dead letter if the examinations were not thorough and somewhat similar in character. The universal expression of officers has been to have a thorough examination, in order that the record of their abilities may be filed in the War Department, if not for immediate advancement over others.

If an officer is to be examined merely to comply with the terms and not the spirit of the law, and without reference to the abilities of others, then it were better to save the expense of examining boards, for such action can only be regarded as an injustice to those who make a study of their profession through a desire to master the Art of War.

An officer's record for previous service should, however, receive consideration, and boards of examination should take all possible means to secure evidence of such before proceeding to an adverse finding.

The certificates of graduation from either the Artillery School or the School of Application at Fort Leavenworth should enter largely into the consideration of the board on the subjects taught at those schools for the advancement of one grade.

The questions in this work are numbered consecutively from beginning to end in order to facilitate the work of examining boards when making up the list of questions to be asked a candidate. All that is necessary for the members to do will be to look for the subheads designated for examination, dot down the *number* of the question or questions to be asked, and give them to the recorder, who will then prepare the questions in detail according to the memoranda. When the examination papers are submitted, they then turn to the number of the question and find

the approximate answer to each, which will enable them to judge of the proficiency of the candidate.

### SUBJECTS AND TEXT-BOOKS.

*Manual of Guard Duty*—Kennon's Revised Manual.

*Military Law*—Winthrop's Military Law and Courts-martial.

*Field Engineering*—Manual of Field Engineering.

*Signalling*—Code adopted by G. O. No. — A. G. O.

*Drill Regulations*—United States Army (Cavalry, Artillery, and Infantry).

*Hippology*.—Fitzwygram's Horses and Stables ; Dwyer's Seats and Saddles.

*Exterior Ballistics*—Ingall's Handbook.

*Fire Discipline*—Batchelor's.

*Minor Tactics*—Shaw's Element's ; Wagner's "Security and Information."

*Military Topography*—Richards'.

*Army Regulations*—U. S.

*Troops in Campaign*—U. S. A. Regulations.







## SUBJECTS OF EXAMINATION.

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### FOR SECOND LIEUTENANTS OF CAVALRY.

#### THEORETICAL.

Manual of Guard Duty.....	Nos. 1- 199
Military Law.....	200- 351
Field Engineering.....	442- 599
Signalling.....	600- 651
Drill Regulations (Cavalry).....	652-1155
Hippology.....	2572-2975 and 3030-3079
Minor Tactics.....	3351-3590
Troops in Campaign.....	4232-4427

#### PARADE AND ORAL.

Drill—Signalling—Administration.

### FOR SECOND LIEUTENANTS OF ARTILLERY.

#### THEORETICAL.

Manual of Guard Duty.....	1- 199
Military Law.....	200- 351
Field Engineering.....	442- 599
Signalling.....	600- 651
Drill Regulations (Artillery).....	1235-1584
Exterior Ballistics and Special Questions.....	4428-4551
Minor Tactics.....	3351-3590
Troops in Campaign.....	4232-4427

#### PARADE AND ORAL.

Drill—Signalling—Mechanical Manœuvres—Administration.

## FOR SECOND LIEUTENANTS OF INFANTRY.

## THEORETICAL.

Manual of Guard Duty.....	1- 199
Military Law.....	200- 351
Field Engineering.....	442- 599
Signalling.....	600- 651
Drill Regulations (Infantry).....	1694-2377
Fire Discipline.....	3080-3247
Minor Tactics.....	3351-3590
Troops in Campaign.....	4232-4427

## PARADE AND ORAL.

Drill—Signalling—Small-arms Firing Regulations—Administration.

## FOR FIRST LIEUTENANTS OF CAVALRY.

## THEORETICAL.

Military Law.....	200- 351
Field Engineering.....	442- 599
Signalling.....	600- 651
Drill Regulations (Cavalry).....	652-1191
Hippology.....	2572-2975 and 3030-3079
Minor Tactics.....	3248-3590 and 3772-3837
Military Topography.....	3838-3939
Troops in Campaign.....	4232-4427

## PARADE AND ORAL.

Drill—Signalling—Small-arms Firing Regulations—Administration.

## FOR FIRST LIEUTENANTS OF ARTILLERY.

## THEORETICAL.

Military Law.....	200- 351
Field Engineering.....	442- 599
Signalling.....	600- 651
Drill Regulations (Artillery).....	1235-1693
Exterior Ballistics.....	4428-4551
Minor Tactics.....	3248-3590 and 3772-3837
Military Topography.....	3838-3939
Troops in Campaign.....	4232-4427

## PARADE AND ORAL.

Drill—Signalling—Mechanical Manœuvres—Administration.

FOR FIRST LIEUTENANTS OF INFANTRY.

THEORETICAL.

Military Law.....	200- 351
Field Engineering.....	442- 599
Signalling.....	600- 651
Drill Regulations (Infantry).....	1694-2467
Fire Discipline.....	3080-3247
Minor Tactics .....	3248-3590 and 3772-3837
Military Topography.....	3838-3939
Troops in Campaign.....	4232-4427

PARADE AND ORAL.

Drill—Signalling—Small-arms Firing Regulations—Administration.

FOR CAPTAINS OF CAVALRY.

THEORETICAL.

Military Law.....	352- 441
Drill Regulations (Cavalry).....	652-1234
Minor Tactics.....	3248-3837
Troops in Campaign.....	4232-4427
Essay.	

PARADE AND ORAL.

Drill—Small-arms Firing Regulations—Administration.

FOR CAPTAINS OF ARTILLERY.

THEORETICAL.

Military Law.....	352- 441
Drill Regulations (Artillery).....	1235-1693
Exterior Ballistics, etc.....	4428-4551
Minor Tactics.....	3248-3837
Troops in Campaign.....	4232-4427
Essay.	

PARADE AND ORAL.

Drill—Administration—Mechanical Manœuvres.

FOR CAPTAINS OF INFANTRY.

THEORETICAL.

Military Law.....	352- 441
Drill Regulations (Infantry).....	1694-2571
Fire Discipline.....	3080-3247
Minor Tactics.....	3248-3837



Troops in Campaign.....	4232-4427
Essay.	

## PARADE AND ORAL.

Drill—Small-arms Firing Regulations—Administration.

## FOR CAPTAINS OF Q. M. DEPT.

## THEORETICAL.

Military Law.....	352- 441
Army Regulations..	3940-4161
Hippology.....	2592-3079

## FOR CAPTAINS OF THE SUBSISTENCE DEP'T.

## THEORETICAL.

Military Law.....	352- 441
Army Regulations.....	3940-4073 and 4162-4230

# PART I.

## *MANUAL OF GUARD DUTY.*

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TEXT-BOOK—*Kennon's Revised Manual.*

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FOR ALL SECOND LIEUTENANTS—Nos. 1-199.



## PART I.

### *MANUAL OF GUARD DUTY.*

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#### ROSTERS.

1. Q. What is a roster? A. A list of officers or men for duty, on which is kept a record of services performed by them.

2. Q. What is the principle in general on which the details for duty are made? A. That the one longest off is the first for detail.

3. Q. What must all details for service in garrison and field be made by; and what may be done if not so made? A. By roster; but officers or men detailed must serve whether a roster be kept or not; after performing the service, they may appeal to superior authority if they deem themselves aggrieved.

4. Q. Into how many classes are the duties performed by roster divided? Explain what they comprise. A. Two classes. The first class comprises: 1st, outposts; 2d, interior guards, including stable guards; 3d, detachments to protect laborers on military works; 4th, armed working parties on such works. The second class comprises all duties and fatigues, without arms, in or out of the garrison or camp.

5. Q. Are the rosters distinct for each class; how are the officers named? A. They are. Officers are named on them in the order of rank, and the details are taken in succession, beginning at the head.

6. Q. What officers, non-commissioned officers, and privates form a distinct roster, and from what duties are they exempt? A. Lieutenants form one roster, and first and second lieutenants are entered on it alternately. Captains form one roster, and are exempt from ordinary fatigue duties; a captain commanding a battalion temporarily is exempt from detail and duty falling to him passes. Lieutenant-colonels and majors form one roster, and may be detailed when importance of duty requires it. Sergeants, corporals, and privates form distinct rosters.

7. Q. Where is the roster of field officers kept in the field? A. At division and brigade headquarters.

8. Q. When an officer or soldier is prevented by sickness from taking his tour of duty, when will he be for detail? A. On being restored to duty he becomes first for detail.

9. Q. If an officer or soldier whose tour it is be not present at the hour of marching, on whom does the duty fall? A. The next after him.

10. Q. What duty does any officer or soldier take upon being relieved from duties of the first class, or who is next for detail? A. The duty of the second class which has fallen to him during that time.

11. Q. How must soldiers be prepared for duties of the first classes? A. They must march on completely armed, and if necessary fully equipped.

12. Q. In commands where light batteries are serving with other troops, how must guard duty be performed? A. A mounted battery, serving with other troops, will furnish its own park and stable guards, police, etc.

13. Q. What duties will the officers and soldiers of a mounted battery be exempt from? A. From other details than those connected with the battery; the men will not be detailed for extra duty in the staff departments, nor for duty interfering with battery duties, if it can be avoided.

14. Q. When should post and camp guards be relieved? A. Every twenty-four hours.

15. Q. What rosters, relative to guard duty, are kept at post or camp headquarters? A. For officers of the day; officers of the guard; sergeants of the guard; corporals of the guard; and musicians of the guard.

16. Q. By whom are the rosters at post or camp headquarters kept? A. For officers of the day and the guard, by the adjutant; all others by the sergeant-major.

17. Q. Can officers serving in the staff departments be required to perform guard duty? A. Ordinarily they are exempt, but at the discretion of the commanding officer they may be placed on the rosters for such duty.

18. Q. How will detachments for armed service be formed? A. As far as the exigencies of the service will permit, detachments for armed service will be formed by taking battalions, companies, platoons, or other subdivisions in turn, according to the roster.

19. Q. When may a company be detailed to form the guard; and what is done when so detailed? A. In the field, when the commanding officer deems it advisable. The captain becomes the officer of the day, and the lieutenants officers of the guard. The company is inspected on its own parade by its captain, and marched to the post of the guard by the senior lieutenant.

20. Q. At what points are guards to be detailed and duly mounted? A. At every military post and in every regiment or separate military command in the field.



21. Q. How may guard duty be performed by a brigade in camp? A. It may have one guard for its camp, or one for each regiment in camp, the latter being preferable; in this case the sentinels between the flanks of regiments may be omitted.

22. Q. At a post where headquarters of more than one regiment are stationed, or in the case of a small brigade in the field and but one guard is necessary for the whole, how will details be made? A. From the headquarters of the command, as follows: For officer of the day and officer of the guard by name; and for all enlisted men by number.

23. Q. How are the officers detailed for guard duty notified? A. When practicable, they are personally notified of their detail by written orders; the details are published at the parade the evening before the tour begins.

24. Q. By whom are the rosters of privates for guard duty kept? A. By the first sergeants of companies.

25. Q. What is a supernumerary of the guard? A. A man mounted with the detail of each company to stand ready to take the place of any member of the guard detail of his company who may be relieved during his tour for sickness or other cause.

26. Q. Who regulates the number of supernumeraries, and from what place on the roster are they taken? A. The number is regulated by the commanding officer, and they are taken from the men next for guard on the roster.

27. Q. What is required of the supernumeraries? A. They shall not leave the camp or post, but shall hold themselves constantly in readiness for duty as members of the guard; they will not be excused, however, from ordinary camp or garrison duties.

28. Q. What is required of all first sergeants at *first sergeant's call*? A. They repair to headquarters and take from the bulletin-board, or receive from the sergeant-major, all the data necessary for them to make their required details.

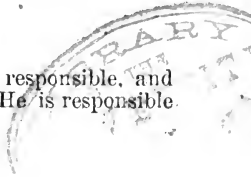
29. Q. When and how should the details made by first sergeants be published? A. At retreat roll-call, and they should be posted on the company bulletin-board.

30. Q. Who keeps the record by which each day is determined the number of privates required from a company, and what method is best for use in determining this number? A. The sergeant-major keeps the record, and that of keeping by decimals is preferable.

31. Q. Give an example of keeping a record by decimals for two days, for a command of four companies, where twelve men are required for guard? A. (For example, see p. 8, M. G. D.)

#### THE COMMANDING OFFICER.

32. Q. For what is the commanding officer responsible, and what are his duties relative to the guard? A. He is responsible.



for the discipline and military instruction of his command. His duty is to exact a faithful, correct, and vigilant performance of guard duty; he prescribes the position of the color line and guard tents; and will fix the number and establish the posts of the sentinels who form the guard of his post or camp. He will cause the sentinels to be so distributed as to require the least possible number of men for guard duty consistent with the objects for which the guard is maintained.

33. Q. What rules should be observed regarding the posts of sentinels? A. No sentinel should be posted at such a distance from the guard-house that he cannot be heard by the sentinel at that point, either directly or through other sentinels. When necessary small posts may be established exterior to the chain of sentinels; they are under the orders of the commander of the camp-guard, and are visited by his patrols.

34. Q. How should orders be communicated to the commander of the guard? A. Through the officer of the day, when practicable.

35. Q. Where and in what manner should the commanding officer receive the officers of the day? A. He will be at his office, or at some point previously designated, immediately after guard-mounting. The officers of the day, having presented themselves, he will acknowledge their salutes, examine the report of the commander of the guard; will relieve the old officer of the day, and give to the new such instructions as may be necessary.

#### THE OFFICER OF THE DAY.

36. Q. For what is the officer of the day responsible? A. For the proper performance of duty by the guard with which he marches on, and for the enforcement of all police regulations; and is charged with the execution of all orders of the commanding officer relating to the safety and good order of the post or camp.

37. Q. When does the actual tour of an officer of the day begin and cease? A. When he receives the report of the adjutant at guard-mounting, and ceases when he has been relieved by the commanding officer.

38. Q. Enumerate some of the regular duties of the officer of the day? A. In the absence of special instructions from the commanding officer, he will inspect the guard and sentinels during the day and night at such times as he may deem necessary; he will prescribe patrols and visits of inspection to be made by officers and non-commissioned officers of the guard; he will see that the commander of the guard is furnished with the parole and countersign before retreat, and will inform him of the presence at the post or in camp of any person entitled to compliment.

39. Q. In case of an alarm of any kind in post or camp, what is required of the officer of the day? A. He will at once take such steps as may be necessary to insure the safety of public property and preserve order in the command, disposing his guard so as best to accomplish the result.

40. Q. To whose orders is the officer of the day subjected in the performance of his duty? A. To those only of the commanding officer, except in case of an alarm of any kind, and at a time of great danger the senior line officer present is competent to give orders to the officer of the day for the employment of the portion of his guard not already occupied with duties prescribed in the Manual of Guard Duty and the standing orders of the post or camp.

41. Q. At inspections and musters where will the officer of the day be present? A. At the post of the guard; but all commands to the guard will be given by the commander thereof.

42. Q. At what places are the new and old officers of the day required to be present? A. The new officer of the day must be present at guard-mounting; the old officer of the day also, if directed by the commanding officer.

43. Q. After the guard has passed in review or ordered to its post, what is required of the old and new officers of the day? A. They proceed to the guard-house, where each will return the salute of his own guard. While the old guard is being relieved they will inspect the guard-house or tents, verify the prisoners, and the new officer of the day will receipt for the articles in charge of the guard if there be no commander of the guard. The old officer of the day will countersign the report of the old guard, after having released all prisoners whose sentences expire on that day. Both officers of the day will then report to the commanding officer, the old officer of the day at that time submitting his guard report.

44. Q. What is required of the officer of the day regarding the release of persons under guard? A. All persons under guard without written charges will be released by the old officer of the day immediately after verifying the number of prisoners, unless specific orders to the contrary have been given in each case by the commanding officer. He will also release at the same time all prisoners whose sentences expire on that day.

45. Q. Who receipts for the articles under charge of the guard? A. The officer of the guard; but if there be none, then the new officer of the day.

46. Q. What phraseology is used in reporting to the commanding officer after guard-mount? Sir, I report as old [or "new"] officer of the day.

## COMMANDER OF THE GUARD.

47. Q. Who is the commander of a guard? A. The senior officer or non-commissioned officer of the guard.

48. Q. For what is the commander of the guard responsible? A. For the instruction and discipline of the guard, and will see that all its members are correctly instructed in their orders and duties, and that they understand and properly perform them; he receives and obeys the orders of the commanding officer and the officer of the day, and reports to the latter without delay all orders relating to the guard not given or transmitted by him; he transmits to his successor all material instructions and information relating to his duties; he is responsible for the general safety of the camp as soon as the old guard marches off from the guard-house. In case of any emergency occurring while both guards are at the guard-house, the senior commander of the two guards will be responsible that proper action is taken.

49. Q. What is enjoined upon the officers of the guard with reference to their presence at the guard-house? A. They will remain constantly with their guards, except while visiting sentinels or engaged elsewhere in the performance of their duty. The commanding officer will allow a reasonable time for getting meals.

50. Q. What may the commander of a guard do regarding a division of the night watch? A. Except in emergencies, he may divide the night with the next in command, but retains his responsibility; the one whose watch it is must be constantly on the alert.

51. Q. If a sentinel calls, "The Guard," what is required of the commander of the guard? A. He will at once send a patrol to such sentinel's post. If the danger be great, in which case the sentinel will discharge his piece, the patrol must be as strong as possible.

52. Q. What number of the men of the guard should there always be at the guard-house? A. When practicable, an officer or non-commissioned officer and at least two privates in addition to the sentinels there on post.

53. Q. What will the commander of the guard do with regard to paying compliments to those entitled to receive them? A. Between reveille and retreat the guard is formed and arms presented; and if it be an officer who is entitled to inspect the guard, after saluting he will report as laid down in the Manual. Between retreat and reveille the commander of the guard salutes and reports, but does not bring the guard to a present. To others entitled to have the guard turned out no report will be made, nor will any report be made to any officer unless he halts in front of the guard.

54. Q. What is required of an officer commanding a guard as to paying compliments while marching his guard to or from the guard-house? A. He will salute all persons entitled to compliment from the guard, first bringing his guard to a carry; a non-commissioned officer marching a guard or relief will salute all officers in like manner.

55. Q. If a person entitled to compliment pass in rear of the guard, what is done? A. The guard does not salute, but stands at a carry, facing the front.

56. Q. After any person entitled to the compliment has been saluted, what is done if he remains in the same vicinity in the way of official recognition? A. Official recognition will be taken by bringing the guard or guards to attention.

57. Q. What is required of the commander of the guard with regard to each relief before being posted? A. It will be inspected by him to see that every sentinel is properly armed and equipped and in proper condition to perform his duties.

58. Q. When must sentinels be relieved? A. Every two hours, unless a shorter time is designated by the officer of the day or commanding officer on account of the weather.

59. Q. What is done if a member of the guard be taken sick, arrested, desert, or leave his guard? A. The adjutant will at once be notified.

60. Q. What sentinels should not be furnished with the countersign, and when must those entitled to receive it be furnished with it? A. The sentinel in front of the guard-house or tent is not furnished with it. It must be communicated to the others before twilight, or at such time as directed by the commanding officer.

61. Q. What will the commander of the guard enter in the guard report? A. A report of his tour of duty, and transmit with it all passes turned in at the post-guard.

62. Q. How often must the commander of a guard inspect the guard-rooms and cells and the irons of prisoners? A. At least once during his tour, and at such other times as he may deem necessary.

63. Q. How must duty be arranged for sentinels over working parties of prisoners? A. The sentinels must be taken from those assigned to posts guarded at night only. If there be none such, the duty will be divided as equally as possible among the privates of the guard.

64. Q. If officers entitled to a salute approach the guard-house while both guards are present, what is done? A. Each commander of the guard will bring his own guard to a carry; the senior of the two guards will then command, *Old and new guards, present arms*; the junior will salute at the command *present arms*; after the salute is acknowledged, the senior brings both guards to a carry and order.

65. Q. When the officers of the day have received the compliments of their guards at the guard-house, what is done by the new commander of the guard? A. He brings his guard to a carry and order; directs the orderly or orderlies to fall out and report, and causes bayonets to be fixed, if so ordered by the commanding officer; bayonets will not then be unfixed during the tour, except in route marches while the guard is actually marching, or when specially directed by the commanding officer. The commander then falls out members of the guard for detached posts, placing them under charge of the proper non-commissioned officers, divides the guard into three reliefs, from right to left, and directs a list of the guard to be made by reliefs. The sentinels and detachments of the old guard are at once relieved by members of the new guard; while this is being done, the two guards stand at ease or rest.

66. Q. At what time does the commander of the old guard turn over his instructions to the commander of the new guard? A. While both guards stand at ease or rest.

#### SERGEANT OF THE GUARD.

67. Q. Who is the sergeant of the guard? A. The senior non-commissioned officer of the guard always acts as sergeant of the guard, and if there be no officer of the guard, will perform the duties prescribed for the commander of the guard.

68. Q. With what is the sergeant of the guard charged? A. With supervision over the other non-commissioned officers and privates of the guard, and with familiarizing himself with all the orders and duties of the corporals and sentinels. He will see that reliefs are turned out at the proper time, and that the corporals are zealous and prompt in the discharge of their duties. He will designate a non-commissioned officer of the guard to take the place of the corporal whose relief is on post should the latter be called away from the guard-house.

69. Q. Who is responsible directly for the articles in charge of the guard? A. The sergeant of the guard. He will see that they are properly cared for, and will make lists of articles taken out by working parties, and see that all such articles are duly returned.

70. Q. What is required of the sergeant of the guard immediately after guard-mounting? A. He will prepare a duplicate list of the names, reliefs, and posts of all the non-commissioned officers, musicians, and privates of the guard, one of which he will retain himself, and hand the other as soon as possible to the commander of the guard.

71. Q. When will the guard-house and premises be thoroughly policed? A. After breakfast and after stable-duty in the cavalry,

the guard-house or guard-tent will be policed by the guard or prisoners, if there be any.

72. Q. What will the sergeant of the guard do at first sergeant's call? A. He will proceed to the adjutant's office and obtain the guard-report book.

73. Q. What is required of the sergeant of the guard relative to soldiers' passes? A. He will receive all passes upon the return of the soldiers having them, and indorse the time at which each returns upon them; at guard-mounting he will turn over all such to the commander of the guard.

74. Q. What is the duty of the sergeant of the guard whenever the guard is turned out? A. To form it promptly, call the roll, and report the result to the commander of the guard. When turned out as a matter of compliment the roll will not be called. The same rule will apply when the guard is called out in a sudden emergency, or on the approach of an armed party. In such cases the roll will be called before dismissing the guard.

75. Q. Who has the direct charge of the prisoners under guard? A. The sergeant of the guard; and he is responsible to the commander of the guard for their security.

76. Q. What will the sergeant of the guard do with the keys of the guard-room and cells? A. He will carry them, and not suffer them to leave his personal possession while he is at the guard-house, except when he leaves the guard-house for any special purpose, when he will turn the keys over to the non-commissioned officer who takes his place; or before forming his guard he will turn over his keys to the non-commissioned officer at the guard-house.

77. Q. Where are prisoners placed when paraded with the guard? A. In line, in its centre.

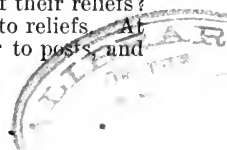
78. Q. What will the sergeant of the guard cause the corporal of each relief to do regarding the prisoners? A. Verify the number whenever his relief goes on post.

79. Q. In what cases will sergeants be employed to relieve and post sentinels? A. When the sentinels are numerous; but they will not be assigned to reliefs unless the number of corporals detailed for guard be less than the number of reliefs.

#### THE CORPORAL OF THE GUARD.

80. Q. By whom are corporals of the guard assigned to their reliefs, and what are their functions? A. They are assigned by the commander of the guard, and their functions are to post and relieve sentinels, and to instruct the members of their respective reliefs in their orders and duties.

81. Q. At what time will corporals take charge of their reliefs? A. Immediately after the division of the guard into reliefs. At that time they will assign the members by number to posts, and



a soldier so assigned shall not be changed to another during his tour of guard-duty, unless by direction of the commander of the guard or the officer of the day.

82. Q. What list does the corporal of a relief make, and what must that list contain? A. He must make a list of the members of his relief, including himself. It will contain the number of the relief, the name, company, and regiment of every member thereof, and the post to which each is assigned. It must be made in duplicate—one copy to be given to the sergeant or senior non-commissioned officer of the guard, the other to be retained by him.

83. Q. In posting the first relief of a new guard, where do the corporals march? A. The corporal of the old guard marches on the right of the leading file, while the corporal of the new guard marches on the left and near the rear file, in order to observe the march. When the last one of the old sentinels has been relieved, the corporals change places.

84. Q. Describe the method of relieving a sentinel? A. When the relief arrives at six paces from a sentinel, the corporal halts it and commands, according to the number of the post, *No. (—)*. The new sentinel comes to a carry, approaches the old, halts at about one pace from him, and both execute port arms or sabre. The corporals advance and place themselves, facing each other, a little in advance of the new sentinel, the old corporal on his right, the new on his left, both at carry or order, and observe that the old sentinel transmits correctly his instructions. The instruction relative to the post having been communicated, the new corporal commands, *Post*, then steps back about two paces and commands, *Forward, march*. The corporals take their places as the relief passes them.

85. Q. Is the sentinel at the guard-house relieved in the same manner as the other sentinels? A. Yes, except that he is the first relieved, and is left at the guard-house.

86. Q. Are all reliefs accompanied by two corporals? A. No; only the first relief of the new guard.

87. Q. Should any sentinel call for the corporal of the guard or call for a "relief," what will be done? A. The corporal of that relief will at once proceed to such sentinel; if relief is called for, he will take with him the next man for duty on that post. If relieved for a short time only, the sentinel relieved will again be posted as soon as the necessity for the relief ceases.

88. Q. Should the sentinel call, *The Guard*, what must the corporal do? A. Promptly notify the commander of the guard.

89. Q. Whose duty is it to communicate the countersign to the sentinels? A. The corporal whose relief is on post, excepting to those at the guard-house immediately before the hour for challenging to begin.

90. Q. What is the duty of the corporal during the hours for challenging, when marching with his relief or patrol? A. To



challenge all suspicious-looking persons or parties he may observe, first halting his relief or patrol, and advance them in the same manner as the sentinels on posts advance like parties. If, however, the route be along a continuous chain of sentinels, he will not challenge unless he has reason to believe that sentinels are neglecting their duties.

91. Q. What is required of corporals regarding the tents or bunks of their men? A. They must ascertain those belonging to the members of their reliefs, in order to turn them out in case of necessity; and should the guard be turned out, each corporal will awaken his own relief and cause its members to fall in promptly.

92. Q. Who should keep on the alert constantly at the guard-house or tent? A. At least one non-commissioned officer, usually the corporal whose relief is on post. He does not fall in with the guard when formed, and if called away gives notice to the sergeant of the guard.

93. Q. What are the duties of the corporal who is on the alert at the guard-house or tent? A. He will promptly go to any sentinel who calls for the corporal of the guard, or for relief; he will promptly notify the officer of the guard if a sentinel should call for the guard; he will see that no one enters the guard-house, or crosses the post of the sentinel of the guard without proper authority; if the hours or half-hours are to be called, he will at the proper time notify No. 1 of the hour; will awaken the corporal whose relief comes next on post in time for the latter to prepare it and post it at the proper hour.

94. Q. Under what conditions will the corporal turn out the guard between retreat and reveille? A. Whenever ordered to do so by an officer entitled to inspect the guard, announcing the title of the officer; and on the approach of an armed party other than a returning relief or detachment of the guard, adding to his order *armed party* and remaining where he can observe the movements of the party while the guard is forming, then return to his post.

95. Q. How will the corporal advance parties approaching the guard at night? A. After the sentinel has performed his duty, the corporal, advancing at port arms, says, *Advance* (so and so) *with the countersign*, or *to be recognized* if no countersign is used. The countersign being correctly given, or the party being duly recognized, the corporal says, *Advance* (so and so), repeating the answer to the challenge of the sentinel.

96. Q. What is done when officers of different rank approach the guard from different directions at the same time? A. The senior will be advanced first, and will not be made to wait for his junior.

97. Q. When and how will a corporal salute all officers? A. Out of ranks and under arms, with the rifle salute. He will salute

all officers whether by day or night. If marching his relief, he will have the relief at a carry before saluting.

98. Q. What will be done with all persons arrested by corporals of the guard or by sentinels? A. They will at once be conducted to the commander of the guard by the corporal.

#### MUSICIANS OF THE GUARD.

99. Q. To whose orders are the musicians of the guard subject? A. To those only of the commanding officer, the officer of the day, and officers and non-commissioned officers of the guard.

100. Q. Where will the musicians remain during their tour of duty? A. Unless otherwise directed by the commanding officer, they will remain at the guard-house and will fall in with the guard when it is formed. They will sleep at the guard-house unless otherwise directed by the commanding officer.

101. Q. What is the duty of the musicians of the guard? A. To sound all calls prescribed, and such other calls as may be ordered by proper authority at such times and places as may be directed.

#### ORDERLY FOR THE COMMANDING OFFICER.

102. Q. How is an orderly for the commanding officer selected, and how is a decision reached as to whom it should be? A. When directed the adjutant will select the orderly from the members of the guard, an extra man being detailed for guard for that purpose. The selection is usually made during the inspection at guard-mounting. That soldier will be chosen who is the most correct in the performance of duty and in military bearing, neatest in person and clothing, and whose arms and accoutrements are in the best condition. If there be doubt as to the relative merits of two or more soldiers, the adjutant may cause them to form in line a few paces from the guard, and cause them to execute the manual of arms, march, etc., to decide the most worthy.

103. Q. How will the orderly be equipped in the field or on the march? A. As directed by the commanding officer.

104. Q. Under whose orders is the orderly, and is he a member of the guard? A. He is a member of the guard, but while on duty as orderly is subject only to the orders of the commanding officer.

#### PRIVATES OF THE GUARD.

105. Q. To whose orders is a soldier subject during his tour of guard duty? A. To the orders of the commanding officer, the officer of the day, and the officers and non-commissioned officers of the guard only.

106. Q. When is a member of the guard required to salute officers? A. At all hours of the day or night when not engaged in the performance of a special duty.

107. Q. Whenever the guard or a relief is dismissed, what is the duty of the members? A. Those not at once required for duty will place their rifles in the arm racks, if they be provided, and will not remove them unless required in the performance of some duty.

108. Q. By whom are privates assigned to reliefs and posts? A. To reliefs by the commander of the guard; to posts usually by the corporal of their reliefs; and they will not change from one relief or post to another during the same tour of guard unless by proper authority.

109. Q. Can a soldier hire another to do his duty for him? A. No; the 36th Article of War forbids it.

#### ORDERS FOR SENTINELS ON POST.

110. Q. How should a sentinel march, turn, and carry his rifle on post? A. He carries his rifle on either shoulder, and at night, or in wet and severe weather when not in the sentry-box, may carry it at a secure. He is not required to halt and change the position of his rifle on arriving at the end of his post, nor to execute *to the rear*, *march*, but faces about while marching in the way most convenient to him, and either to the right about or left about, and at any part of his post, as may be best suited to the proper performance of his duties.

111. Q. In very hot weather, what may sentinels be permitted to do? A. Stand at ease on their posts, provided they can in this position discharge their duties. Sentinels will, however, before taking advantage of this privilege, obtain the express authority of the commander of the guard or officer of the day.

112. Q. Under what circumstances may a sentinel quit his piece? A. Not at all, except on an explicit order from some person from whom he lawfully receives orders while on post; under no circumstances will he yield it to any other person.

113. Q. What is a sentinel required to do regarding the arrest of persons? A. He will arrest suspicious persons prowling about the post or camp at any time; all parties to a disorder occurring on or near his post; or any one who attempts to enter the camp at night—even soldiers of other corps—and turn over all persons arrested to the corporal of the guard.

114. Q. If relief becomes necessary on account of sickness, what call will the sentinel make? A. *Corporal of the Guard, No.—; relief.*

115. Q. What change is made by a sentinel in the call for the corporal of the guard for any purpose other than relief? A. He omits the word “relief.”

116. Q. What will a sentinel do when he is to be relieved? A. He will halt and face toward the relief with arms at a carry when the relief is fifteen paces from him. He will come to port arms when the new sentinel halts; he gives in a low tone his instructions to the one taking port. Both sentinels then resume the carry, face toward the new corporal, and step back so as to allow the relief to pass in front of them; the old sentinel takes his place in rear of the relief as it passes him, his piece in the same position as that of the relief's.

117. Q. What call will the sentinel make for challenging parties at night? A. *Halt. Who is there?*

118. Q. If a mounted party is challenged, what will the sentinel call, after challenging? A. *Dismount.*

119. Q. To whom may a sentinel divulge the countersign? A. To no one except the sentinel who relieves him, or to a person from whom he properly receives orders, on such person's verbal order, given personally.

120. Q. In case of fire or disorder, what calls will the sentinel make? A. In the event of fire, he will call; *Fire, No. —*, giving the number of his post; if possible he will extinguish the fire by his own efforts. In case of disorder, he will call, *The Guard, No. —*. If the danger be great, he will in either case discharge his piece before calling.

121. Q. How near will a sentinel permit persons to approach him at night? A. Until duly recognized by countersign or otherwise, not nearer than ten feet; and then only one of a party to approach him for the purpose of giving the countersign.

122. Q. If a party be already advanced and in communication with a sentinel, what will he do if any other party approaches? A. He will challenge the other party, and if the latter be senior to the one already on his post, the sentinel will advance such party at once. The senior, if competent to give orders, may direct the sentinel to advance any or all of the other parties. Without such directions the sentinel will not advance any of them until the senior leaves him. He will then advance the senior only of the remaining parties, and so on.

123. Q. What is the order of seniority that will govern a sentinel in his actions on post? A. Commanding officer, officer of the day, officer of the guard, officers, patrols, non-commissioned officers of the guard in the order of rank, friends.

124. Q. When may sentinels be permitted to call the hours, and how should this be done? A. When not in the presence of the enemy. They will call successively, in the numerical order of their posts, beginning at the guard-house, each one giving the number of his post, repeating the hour of the night, then adding, *All's well*, thus: *No 2, eleven o'clock. All's well.*

125. Q. If the call of the hour should be omitted by any one sentinel on post, what is the duty of the next preceding him?

A. If the call is not taken up within a reasonable time, he will call the corporal of the guard and report the facts.

#### ORDERS FOR SENTINELS AT THE POST OF THE GUARD.

126. Q. Give examples of the manner in which a sentinel turns out the guard? A. *Turn out the guard—commanding officer; Turn out the guard—Governor of Territory; Turn out the guard—national colors; Turn out the guard—armed party.*

127. Q. What is the sentinel at the post of the guard required to do at the approach of the new guard at guard-mounting? A. He will order the guard turned out for an armed party, even though the guard be already formed.

128. Q. If the person for whom the guard is ordered turned out does not wish it to do so, what is done? A. He will salute the sentinel and say, *Never mind the guard*, whereupon the sentinel calls out, *Never mind the guard*.

129. Q. Under what circumstances will a guard not be ordered to be turned out by a sentinel? A. The guard will not be turned out for an officer while a senior entitled to the compliment is at or coming to the post of the guard.

130. Q. Enumerate some of the duties of a sentinel at the guard-house? A. At the approach of any armed body he will warn the commander of the guard; he will arrest all suspicious or disorderly persons; he will not permit enlisted men to pass unless orders to the contrary have been given; in case of fire or disorder in the vicinity of the guard-house he will call the corporal of the guard and report the facts to him.

131. Q. How will the sentinel at the guard announce the hours of the night? A. At the direction of the non-commissioned officer of the guard he will call, *No. 1, (such) o'clock*. After the call has passed around the chain of sentinels, he will call, *All's well*.

#### COMPLIMENTS FROM SENTINELS.

132. Q. In what manner shall sentinels pay compliments? A. The salute of a sentinel will habitually be rendered without halting for the purpose; an infantry sentinel will salute with the *rifle salute*; cavalry, with sabre drawn, whether mounted or dismounted, will salute with the *present*; armed with the carbine, if dismounted, he will salute with the carbine; if mounted, he will *advance carbine*.

133. Q. How is the *present arms* used? A. As the simultaneous salute of a body of men at command.

134. Q. At what distance should salutes be given? A. The limit within which individuals and insignia of rank can be readily recognized—about thirty paces.

135. Q. When will a sentinel salute an officer approaching

him? A. When he arrives within about six paces; but if, after coming within saluting distance, the officer does not approach within six paces, the sentinel salutes when the officer arrives nearest to him, or just before he crosses the sentinel's post.

136. Q. What rules apply to a sentinel with regard to saluting colors carried by a color guard or armed party, or when the officer commanding a party, or the remains of a deceased officer or soldier are carried past? A. The same as those for saluting officers.

137. Q. What will the sentinel do in the case of an armed party with regard to saluting? A. He will halt when it is about fifteen paces from him, facing toward the party, with his piece at a carry. If not himself relieved, he will, as the party passes, place himself so that it will pass in front of him; he resumes walking his post when the party has passed six paces beyond him.

138. Q. What will a sentinel do on the approach of an officer from whom he properly receives orders? A. He will walk his post toward the officer, and if not spoken to, will salute as prescribed; if spoken to, he will halt, facing toward the officer, his piece at *port arms*. He salutes when the officer leaves him.

139. Q. How will the sentinel act with regard to the approach of a non-commissioned officer of the guard? A. The same as for an officer, except that he does not salute.

140. Q. Are officers required to be in uniform in order to receive a salute? A. No; they are to be saluted whether in uniform or not.

#### COMPLIMENTS FROM GUARDS.

141. Q. When will guards turn out and present arms? A. When the national or regimental colors, or standards, not cased, are carried past by a color guard or any armed party; also when the party carrying the colors is at drill. Colors and standards when cased will not be saluted, nor will the guard turn out for them. All guards will turn out when armed parties approach their posts; to parties commanded by commissioned officers they will present arms, officers saluting.

142. Q. How frequently may guards be turned out for the same party? A. As often as those entitled to the compliment pass.

143. Q. For whom does the guard of a general officer turn out? A. To him and his superiors in rank only.

144. Q. When will guards not turn out to pay compliments? A. After sunset; nor will any compliments be paid by the guard between retreat and reveille.

## SPECIAL ORDERS.

145. Q. What is understood by special orders to a sentinel? A. They define the duties to be performed by a sentinel on a particular post, and are prescribed by the commanding officer.

146. Q. What will invariably constitute a part of the special orders of every sentinel? A. The number, limits, and extent of his post.

147. Q. What is required of the sentinel at the commanding officer's tent? A. He will warn the commanding officer, day or night, of any unusual movement in or about camp.

## COLOR LINE AND SENTINELS.

148. Q. What number of sentinels is placed on the color line, and for what purpose? A. A sufficient number not to exceed three, to guard the colors and stacks.

149. Q. How are color sentinels selected in camps of instruction? A. By the adjutant, in the same manner as he selects the orderly.

150. Q. In what manner is the duty of selected color sentinels different from that of other sentinels? A. They remain on post only so long as the stacks are formed; when stacks are broken, they may be permitted to return to their respective companies. If necessary, their places are taken at night by the other sentinels posted on the color front or on the flanks. They are required to report in person to the commander of the guard at reveille and retreat. They will fall in with the guard, under arms, at guard-mounting. They are not placed on the regular reliefs, nor are their posts numbered. In calling for the corporal of the guard they add to the call *Color line*.

151. Q. What is the time for walking post on the color line? A. The time is equally divided among the color sentinels by the commander of the guard.

152. Q. What general orders will color sentinels observe? A. All that are prescribed for sentinels on other posts.

153. Q. What are the special orders for color sentinels? A. They will not permit the colors to be moved except in presence of an armed escort, nor allow any one to touch them but the color-bearer or a non-commissioned officer of the guard accompanied by two armed men. They will not permit any arms to be taken from the stacks, except by order of an officer or a non-commissioned officer of the guard.

154. Q. What will a color sentinel do with regard to persons saluting the colors? A. If any one passing the colors or crossing the color line fails to salute the colors, the sentinel will caution him to do so, and if the caution be not heeded, he will call the corporal of the guard and report the facts.

## SUPERNUMERARIES.

155. Q. What restrictions are placed upon supernumeraries ?  
A. They will not be allowed to leave the camp or garrison ; they will hold themselves in readiness for detail as members of the guard.

156. Q. What duties are supernumeraries excused from ? A. They will not be excused from ordinary camp or garrison duties ; but will not be detailed for anything that will interfere with their duties as supernumeraries.

## PRISONERS.

157. Q. When may the commander of a guard place a civilian in confinement ? A. Only on an order from higher authority, unless arrested in the act of committing some crime within the limits of the military jurisdiction, in which case the commanding officer will be immediately notified.

158. Q. What is required of an officer ordering a soldier into confinement ? A. He will send, as soon as practicable, a written statement, signed by himself, to the commander of the guard, setting forth the name, company and regiment of such soldier, and a brief statement of his alleged offence. To give the number of the article of war under which the offences is charged is sufficient.

159. Q. After the first day's confinement of a prisoner, under what authority is he considered as held ? A. Under the authority of the commanding officer until sentence has been duly promulgated ; after promulgation of sentence, by authority of the officer who reviews the proceedings of the court.

160. Q. What is the position of the prisoners at parade when orders are published to them ? A. Three paces in front of the centre of the line of officers, facing to the front.

161. Q. What is the position of the prisoners and guard prior to being brought to the front to hear their sentences read ? A. They are three paces in rear of the line of file-closers, the outer flank of the guard opposite the outer flank of the battalion. In the parade of the regiment the prisoners and guard are in rear of the most convenient flank of the centre or right centre battalion.

162. Q. What will the prisoners do when their sentences are read on parade ? A. Each prisoner, as his name is called, will step three paces to the front, halt, uncover, and remain uncovered during the publication of the orders in his case. He will then cover, face about, and take his place in the detachment.

163. Q. What is done with a soldier who has been tried and acquitted when sentences are promulgated on parade ? A. He will not be paraded in front of the battalion.

164. Q. When orders are not to be read at parade, what will be



done with those promulgating the sentence of a man in confinement? A. The officer of the guard, or the officer of the day, if there be no officer of the guard, will read the sentences of prisoners to them when the order promulgating the same is received.

165. Q. How should prisoners be separated into classes? A. Those awaiting trial by, or undergoing sentence of, general court-martial, and those confined for serious offences will, if practicable, be kept apart from those confined by sentence of a garrison court or for minor offences. As far as practicable, those awaiting trial or sentence will not be sent out to work with prisoners undergoing sentence.

166. Q. What are the proper working hours of prisoners? A. Except when otherwise directed by the commanding officer, from reveille until retreat, with proper intermissions for meals.

167. Q. When will prisoners be paraded with the guard? A. At reveille and retreat, roll-calls, and, except those out at work, at guard-mounting; but at no other times.

168. Q. What is the sentinel at the guard-house charged with in relation to prisoners? A. He has charge of the prisoners, and shall allow none to escape or to cross his post except under guard; he shall allow no one to communicate with them without permission from proper authority; he shall report to the corporal of the guard any suspicious noise made by prisoners; and he must remember to tell, whenever asked, how many prisoners are in the guard-house and how many are at work elsewhere.

169. Q. What must the sentinel at the guard-house do whenever prisoners pass his post returning from work? He must call, *Corporal of the guard, (so many) prisoners.*

170. Q. What will be done by a sentinel if a prisoner attempts to escape? A. The sentinel will call, *Halt.* If he fail to halt when the sentinel has once repeated his call, and if there be no other possible means of preventing his escape, the sentinel will fire on him.

171. Q. In what manner should a sentinel perform his duty while in charge of prisoners? A. He will not allow the prisoners to converse with each other nor with any person without permission from proper authority. He will not himself speak to them, except in the execution of his duty; he will see that they do not straggle, that they are orderly in deportment, and that they keep constantly at work; he will keep the prisoners constantly in front of him, and never allow them to walk at his side or in his rear; he will not at any time lose sight of them.

172. Q. In crossing the post of the sentinel at the guard-house what will a sentinel in charge of prisoners call? A. *No. 1, (so many) prisoners.*

## GUARD PATROLS.

173. Q. What is the guard patrol? A. A small detachment of two or more men detailed to observe and procure information of the enemy, or for the performance of some special service connected with guard duty.

174. Q. How are guard patrols detailed? A. Usually from the guard, and receive instructions from the commander.

175. Q. If the patrol be required to go beyond the chain of sentinels, what will be done? A. Its commander will be furnished with the countersign and the outposts and sentinels will be warned.

## COUNTERSIGNS AND PAROLES.

176. Q. What is a countersign? A. A word given daily from the principal headquarters of a command to aid guards and sentinels in identifying persons who may be authorized to pass at night.

177. Q. To whom is a countersign given? A. To such persons as are entitled to pass and repass sentinels' posts during the night, and to officers, non-commissioned officers, and sentinels of the guard.

178. Q. What is a parole? A. A word used as a check on the countersign, in order to obtain more accurate identification of persons.

179. Q. To whom should a parole be imparted? A. To those who are entitled to inspect guards and to commanders of guards.

180. Q. What names are generally used for countersigns and paroles? A. The countersign is usually the name of a battle; the parole, that of a general or other distinguished person.

181. Q. If the countersign be lost, or if the member of the guard desert with it, what is done? A. The commander on the spot will substitute another for it, and report the case at once to the proper superior, that immediate notice may be given to headquarters.

182. Q. What is required of all persons with reference to sentinels? A. They are required to observe respect toward them.

## MISCELLANEOUS.

183. Q. How will one who is authorized to inspect sentinels at night or in the field proceed? A. He takes from the main body of the guard an escort, if necessary, to accompany him to the next guard, on reaching which he orders back the escort, and taking a new one, proceeds in like manner to other guards.

184. Q. When may a guard be turned out by direction of any

person entitled to inspect it? A. At any time between retreat and reveille.

185. Q. What does the band, the adjutant, the sergeant-major, the first sergeants, and the supernumeraries constitute at guard-mounting? A. They are held to be a portion of the guard until the guard has passed the officer of the day in review.

186. Q. What should be the character of questions propounded to a sentinel by one authorized to visit and inspect him? A. They should be such as to ascertain his knowledge of his duties and surroundings, without seeking to confuse him.

187. Q. What are officers and men required to do when passing the colors? A. Give the prescribed salute; when without arms in the hand, by uncovering; if colors are on the stacks, the salute will be made on crossing the color line, or on passing the colors.

188. Q. Where will the camp guard march while *en route*? A. In rear of the regiment, with prisoners; or in advance, with the camping party.

189. Q. When the camp guard marches with the camping party, where does it form? A. On the ground marked for the regiment, on reaching camp; and the commander of the guard furnishes the sentinels required by the commander of the camping party.

190. Q. Where should sentinels be placed on the arrival of a camping party? A. Over the stores of provisions, fuel and forage in the vicinity, and over the water when it is scarce, to prevent waste or fouling.

#### POLICE AND FATIGUE DUTY.

191. Q. Who supervises the police and fatigue duties of a post or camp? A. They may be placed under the supervision of an officer detailed for the purpose; otherwise they are under the supervision of the officer of the day. Either of these officers will have general supervision under the orders of the commanding officer. Fatigue parties will be furnished him when the number of prisoners is insufficient for the necessary police purposes.

192. Q. By whom is the general police duty usually done in camp? A. By the old guard, under the direction of the officer of the day.

193. Q. What is the tour of police duty and when does it begin? A. It is for 24 hours, beginning with fatigue call in the morning of the day following that on which the guard marches off.

#### PROPERTY UNDER CHARGE OF THE GUARD.

194. Q. What in general are the articles kept at the guard-house for strictly post or police purposes? A. Flags, spades, shovels, axes, hatchets, pickaxes, and brooms.

195. Q. In what manner are non-commissioned officers of the

guard responsible for these articles? A. They do not receipt for them, but are held accountable to the officer of the day for their safe-keeping. In case of loss, destruction, or other disposition, the facts relating thereto will be entered on the guard report.

#### FLAGS AND COLORS.

196. Q. What is the designation and size of the flags issued to military posts, and when will they be hoisted? A. The garrison flag ( $36 \times 20$ ) is issued only to posts designated from headquarters of the army; to be hoisted only on holidays and important occasions. The post flag ( $20 \times 10$ ) is furnished to all posts garrisoned by troops; to be hoisted only in pleasant weather. The storm flag ( $8 \times 4.2$ ) is furnished to all occupied military posts; to be hoisted in stormy weather.

197. Q. What colors and standards are carried by troops? A. Each regiment of artillery and infantry has two silken colors, the national and regimental; the battalion of engineers has two colors, the national and the battalion; each mounted regiment has a silken standard.

198. Q. What duty is imposed on the post commander regarding the post flag? A. He will see that the proper flag is hoisted; that, in case of a storm, either of wind or rain, the storm flag is promptly raised; that the flag is hoisted at reveille and lowered at retreat; that the national flag will always be displayed at the time of firing salutes; and that the flag will under no circumstances be dipped by way of salute or compliment.

199. Q. Under what circumstances and for how long will a flag be displayed at half-staff, and how is it placed so? A. On the death of an officer at a military post the flag will be at half-staff between the hours of reveille and retreat, until the last salvo or volley is fired over the grave; or until the remains are removed from the post if they are not interred there. During the funeral of an enlisted man the flag will be at half-staff. It is hoisted to the top after the final volley or gun is fired, or after the remains are taken from the post. When the flag is to be displayed at half-staff, it is *lowered* to that position from the top. It is afterwards hoisted to the top before it is finally lowered.

## PART II.

### *MILITARY LAW.*

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TEXT-BOOKS: { *Winthrop's Abridgment of Military Law.*  
                  { *Winthrop's Unabridged, Parts II. and III.*  
                  { *G. O. No. 100, A. G. O., 1863.*

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FOR SECOND LIEUTENANTS—Nos. 200–351.

FOR FIRST LIEUTENANTS—Nos. 200–351.

FOR CAPTAINS OF THE LINE—Nos. 352–441.

FOR CAPTAINS OF THE Q. M. D.—Nos. 352–441.

FOR CAPTAINS OF SUB. DEPT.—Nos. 352–441.



## PART II.

### *MILITARY LAW.*

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#### CHAPTER I.

200. Q. How is military law divided? A. Into : 1. Military law proper ; 2. The law of war.

201. Q. What is *military law proper*? A. The specific law which governs the army as a separate community alike in peace and in war.

202. Q. What is the law of war? A. An exercise of military authority and jurisdiction over persons both military and civil, operative only in time of war or similar emergency.

203. Q. Where is the source of authority for military law and jurisdiction to be found? A. In the constitution of the United States.

204. Q. Name some of the constitutional provisions which may be regarded as the source of or authority for our existing military law? A. Those by which Congress is empowered "to raise and support armies;" "to make rules for the government of the land and naval forces;" "to provide for calling forth the militia to execute the laws of the Union, suppress insurrections, and repel invasions;" "to provide for organizing, arming, and disciplining the militia, and for governing such part of them as may be employed in the service of the United States;" etc. (or any others named in the text-book).

#### CHAPTER II.

205. Q. What does the written military law consist of? A. 1. The Articles of War; 2. The enactments of Congress relating to the discipline or government of the army, not included in the Articles of War; 3. The Army Regulations; 4. General and special orders.

206. Q. Under what authority are the Articles of War enacted by Congress? A. Under its constitutional authority "to make rules for the government of the land and naval forces."

207. Q. Historically considered what is the origin of the majority of our present Articles of War? A. Many of them antedate the Constitution of the United States, being derived from those adopted by the Continental Congress between 1775 and 1786, which are themselves taken from pre-existing British Articles having their inception in remote antiquity.

208. Q. What are Army Regulations? A. Authoritative rules or directions, as distinguished from enactments, relating to details of military duty and discipline.

209. Q. Where is the authority for Army Regulations to be found? A. In the distinctive functions of the President as Commander-in-chief and as Executive. Congress has also authorized the President to make and publish regulations for the government of the army in accordance with existing laws. The President, however, has the inherent power to make regulations independently of Congress.

### CHAPTER III.

210. Q. What does the unwritten military law consist of? A. I. The customs of the service. II. The unwritten laws and customs of war.

211. Q. In what particular branch of military administration are these customs sanctioned by law? A. They are referred to in the 84th Art. of War as a means of guiding courts-martial in the administration of justice.

212. Q. Give the essentials of a usage or custom at military law? A. A usage or custom must consist of a fixed and uniform practice of long standing, which is not in conflict with existing statute laws or regulations. It cannot be established by proof of isolated or occasional instances, but must be built up out of a series of precedents.

### CHAPTER IV.

213. Q. By what tribunal is military law mostly administered? A. The court-martial.

214. Q. To what department of the government does the court-martial belong, and what is its nature? A. It belongs to the Executive Department of the Government. It is an instrumentality of the executive power: a temporary summary tribunal with criminal jurisdiction, and is in its procedure assimilated in sundry particulars to a civil judge and jury. It is not a court of record, and its judgments are not subject to be appealed from.

215. Q. How may a judgment of a court-martial be collater-



ally revised by a civil court? A. Where the action of a court-martial has been unauthorized and illegal, and upon approval has been effectuated, the person who has suffered therefrom may appeal to the proper civil courts for redress. If confined under an illegal sentence, he may procure himself to be released by writ of *habeas corpus*. For any illegal punishment adjudged and executed he may recover damages in a civil suit.

216. Q. Name the different kinds of courts-martial. A. The General Court-martial, the Regimental Court-martial, the Garrison Court-martial, the Field Officers' Court, and the Summary Court.

## CHAPTER V.

217. Q. Who may under the law constitute General Courts-martial? A. 1. The President, and 2. Certain military commanders.

218. Q. Where is the authority found empowering the President to institute general courts-martial? A. 1. In the Constitution of the United States, making the President commander-in-chief of the army. 2. In the 72d Art. of War, where the officer, authorized under the law to appoint a general court-martial, is the accuser or prosecutor of an officer of his command proposed to be brought to trial. 3. In the statute requiring the President to convene a general court-martial for the trial of an officer who, having been summarily dismissed in time of war, applies in writing for such trial.

219. Q. Define the meaning of the words "accuser" and "prosecutor" used in the 72d A. W. A. "Accuser" means one who either originates the charge or adopts and becomes responsible for it; "prosecutor" means one who proposes or undertakes to have it tried and proved.

220. Q. What military commanders are authorized by law to convene general courts-martial? A. Any general officer commanding an army, a territorial division, or a department, or a colonel commanding a separate department, any commander—in time of war—of a division, or separate brigade of troops, and the Superintendent of the U. S. Military Academy.

221. Q. Give the provisions of law regulating the composition of general courts-martial in relation to the class, rank, and number of members. A. Only commissioned officers are eligible for detail. No officer shall, when it can be avoided, be tried by officers inferior to him in rank. Officers of the regular army are not competent to sit on courts-martial to try officers and soldiers of other forces, except offenders of the marine corps detached for service with the army by order of the President. Courts-martial for the trial of militia must be composed of militia officers only. General courts-martial may consist of any number of officers

from five to thirteen inclusive, but they shall not consist of less than thirteen where that number can be convened without manifest injury to the service.

## CHAPTER VI.

222. Q. Give the place or field of the jurisdiction of general courts-martial. A. The jurisdiction of these courts is coextensive with the territory of the United States. It also extends to the places or territory held or occupied by our armies when invading the domain of a foreign nation with which we are at war. And it includes also offenses committed by our officers and soldiers within the line or neighborhood of our armies, when in the transit, by the permission of its Government, through the domain of a foreign nation with which we are at peace.

223. Q. How is the jurisdiction of a general court-martial limited as to time? A. By the provisions of the statute of limitation, and by the termination of a state of war as far as such offenses are concerned over which the jurisdiction of the court is restricted to the period of war.

224. Q. What persons are subject to the jurisdiction of courts-martial? A. 1. The army of the United States; 2. The militia when called into the service of the United States; 3. Officers and soldiers of marines when detached for service with the army; 4. Certain civilians subjected to military discipline in time of war.

225. Q. What are the provisions of law in relation to the jurisdiction of general courts-martial over civilians in time of war? A. All retainers to the camp and all persons serving with the armies of the United States in the field, though not enlisted soldiers, are under the provisions of the 63d Art. of War, to be subject to orders according to the rules and discipline of war, and under the 45th and 46th Art. of War and sec. 1343 of the Rev. Stat. all persons who shall relieve, correspond with, or give intelligence to the enemy, or shall act as spies, are triable by general courts-martial.

## CHAPTER VII.

226. Q. In whom do the Articles of War and Army Regulations place the power to arrest officers? A. In the commanding officer, except in cases and for offenses especially designated in the 24th Art. of War.

227. Q. What is the duty of the commanding officer when he places an officer in arrest and releases him without preferring charges? A. To make a written report of his action to the Department Commander, stating the cause.

228. Q. What is the provision of the 65th Art. of War in relation to the arrest of officers? A. Officers charged with crime

shall be arrested and confined in their barracks, quarters or tents, and deprived of their swords by the commanding officer, and any officer who leaves his confinement before he is set at liberty by his commanding officer shall be dismissed from the service.

229. Q. What are the provisions of the 66th Art. of War in relation to the confinement of soldiers? A. Soldiers charged with crimes shall be confined until tried by courts-martial, or released by proper authority.

230. Q. In whom is the authority vested to confine soldiers? A. Except as provided in the 24th Art. of War, no soldier should be confined without the order of an officer, who shall previously inquire into his offence.

231. Q. What is the rule as to the confinement of soldiers who are charged with offences triable by a summary court? A. They should not be confined in the guard-house, but placed in arrest in quarters before and during trial and while awaiting sentence, unless in particular cases restraint may be necessary.

## CHAPTER VIII.

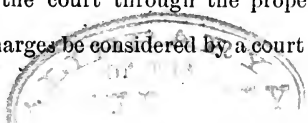
232. Q. What is a "charge" in military procedure, and how is it divided? A. A charge is simply a description in writing of the alleged offence of the accused. It is divided into two portions: the *charge* or designation of the specific military offence believed to have been committed; and the *specification* or statement of the acts or omissions of the accused claimed to constitute the offence named in the charge.

233. Q. What are the recognized forms of charges? A. A charge may be expressed (1) in a word or words specifying the offence, as "Desertion," "Drunkenness on duty;" or (2) as "Violation of the — Art. of War," naming the article under which it is preferred; or (3) it may contain the two forms and be phrased as "False muster in violation of the 14th Art. of War," etc. (The second form, viz., Violation of the 62d Art. of War, with an appropriate specification attached, was held to be a valid pleading by the Supreme Court of the United States in the case of Sergeant Mason.)

234. Q. By whom are charges to be preferred? A. A military charge must be formally preferred, i. e., officially subscribed by a commissioned officer of the army. But it may originate either with the preferrer himself, or with any other individual, whether or not in the military or public service.

235. Q. To whom should charges be preferred? A. To the commander authorized to order the court through the proper military channels.

236. Q. When may additional charges be considered by a court?



A. When they have been brought before the court prior to its being sworn.

### CHAPTER IX.

237. Q. Describe the assembling and opening of a general court-martial. A. Pursuant to the convening order (and the supplementary orders, if any) the officers named in detail for the court assemble in full uniform, at the time and place designated, in such building or room as may have been set apart for the purpose. When five or more members and the judge-advocate have arrived they may proceed to business; till five appear those present must adjourn from day to day to await at least the minimum number. A quorum of members and the judge-advocate being present, the senior member calls them to order; the order convening the court is read by the judge-advocate; the roll is called, the members taking their seats according to their relative rank alternately on the right and left of the president. The judge-advocate is commonly seated opposite the president, and seats are provided near him for the accused and his counsel and for the witnesses.

When the preliminary business, such as examining the order convening the court and the charges and specifications referred to the court for trial, is disposed of, the accused is introduced, and upon his application his counsel may be admitted and introduced at this stage of the proceedings.

238. Q. Who presides over a general court-martial, and what are the duties of the president? A. The senior in rank of the members present presides. He administers the oath to the judge-advocate, presides during all the proceedings, opens the court, calls it to order at each session, announces the decisions and adjournments of the court, preserves order and decorum, sees that the rights of all persons before the court who are entitled to consideration are respected, conducts the routine of each day's business, and in general acts as the organ of the court. At the conclusion he authenticates the record by his signature in connection with the judge-advocate.

239. Q. What rules govern members of general courts-martial in voting? A. In voting the members are required to begin with the youngest in commission. All questions and issues are decided by a majority vote, except in the single instance of adjudging a death sentence, for which a two-thirds vote is required. A tie vote is no vote, i.e., a proposition upon which the vote is a tie is not carried.

### CHAPTER X.

240. Q. By whom is the judge-advocate of a court-martial appointed, and what should be principally his personal qualifications?

A. By the officers convening the court. Of the personal qualifications of an officer for the position of judge-advocate, the principal are : 1. Fitness, i.e., proper training and aptitude. 2. Absence of bias, i.e., an absence of any such prejudice for or against the accused as may materially affect the efficient, fair or courteous preformance of his functions.

241. Q. What are the duties of the judge-advocate before the trial? A. To serve upon the accused a copy of the charges and of the convening order, to notify him of the time and place of meeting of court, to obtain from him the names of the witnesses whom he desires summoned, to summon or cause to be served with summons the material witnesses, to confer with the witnesses for the prosecution when accessible, to procure the written evidence required to be used on the trial, and otherwise to prepare duly to prosecute. It also devolves on the judge-advocate to make requisition upon the quartermaster's department for a courtroom and furniture, and for the requisite stationery.

242. Q. What capacities does the judge-advocate sustain at the trial. A. Prosecutor, adviser to the court and recorder.

243. Q. Give in their proper order the details the record of a general court-martial should exhibit. A. It should exhibit first copies of order or orders convening the court, detailing the members and judge-advocate, relieving or adding members, changing the time or place of session, etc. It should set forth the original assembling of the court, and all subsequent assemblings, as also all adjournments and continuances. It should state, in order, challenges, if any, and the proceedings had thereon, the swearing of the members and judge-advocate, the arraignment, charges, pleas, (with special pleas or motions, if any), the full testimony in the words as nearly as possible of the witnesses, with the depositions and documentary evidence, if any (the latter being, perferably, annexed as exhibits), the closing arguments or statements, the findings, and the sentence in case of conviction. It should also embrace any proceedings which may be had by the court upon a revision for the purpose of correcting errors. It should further show, in compliance with regulations, that the record is authenticated by the signatures of the president and the judge-advocate.

244. Q. What power does the law vest in the judge-advocate in relation to compelling witnesses to appear before courts-martial? A. He is empowered to issue like process to compel witnesses to appear and testify which courts of criminal jurisdiction within the state, territory or district, where such military courts shall be ordered to sit, may lawfully issue.

#### CHAPTER XI.

245. Q. Give the written law on the subject of challenges. A. The Articles of War say that a member of a court-martial may be

challenged by a prisoner, but only for cause stated to the court. The court shall determine the relevancy and validity thereof, and shall not receive a challenge to more than one member at a time. Further, the army regulations direct that the record of the court shall show that previously to the swearing of the court the accused was "asked whether he had any objection to any member and his answer thereto."

246. Q. Give the principal grounds of challenge. A. Opinion formed or expressed; personal prejudice or hostility; having preferred the charges; being a material witness; interest—having a right to promotion, intimate personal relations; having taken part in a former trial or inquiry.

## CHAPTER XII.

247. Q. What engagements does an officer assume in being sworn as a member of a court-martial? A. To try according to evidence. To try the matter before the court. To duly administer justice without partiality, favor or affection. To administer justice according to the Art. of War. In case of doubt to administer justice according to his conscience, but understanding, and the custom of war. Not to divulge the sentence, except to the judge-advocate, before it is duly published, or to disclose the vote or opinion of any member, unless required to do so as a witness before a court of justice.

248. Q. If an accused has pleaded to the charge and specification, may he withdraw his plea and substitute another? A. If he has pleaded *not guilty* he may be permitted by the court to withdraw his plea and substitute the plea of *guilty*, and also *vice versa*.

249. Q. Name the special pleas, or, as they are sometimes termed, the *pleas in bar*. A. The plea to the jurisdiction; the plea of the statute of limitation; the plea of former trial for the same offence, and the plea of pardon.

## CHAPTER XIII.

250. Q. What are the legal hours of session of a court-martial when not extended by the officer appointing the court? A. From eight in the morning to three in the afternoon.

251. Q. How are the witnesses in a case before a court-martial qualified? A. By being sworn in accordance with the 92d Article of War.

252. Q. Name some of the special defences available in trials before courts-martial. A. Alibi, ignorance of fact, drunkenness, insanity, compulsion of the enemy, requirements of military discipline.

253. Q. May civilians refusing to testify before military courts be proceeded against by military courts under existing laws? A. No.

## CHAPTER XIV.

254. Q. What rules of evidence should in general govern courts-martial? A. The rules of the law of evidence as recognized and followed by the criminal courts of the United States. These are the common-law rules of evidence in criminal cases except when Congress has provided otherwise.

255. Q. What is to be proved in a case before a court-martial? A. 1. That the act charged as an offense was really committed. 2. That the accused committed it. 3. That he committed it with the requisite criminal intent.

256. Q. How much is to be proved to authorize a conviction? A. The guilt of the accused must be established beyond a reasonable doubt.

257. Q. What is a presumption of law? A. A conclusion or general principle arrived at by the law itself, and accepted by the courts without evidence, or in the absence of evidence to the contrary.

258. Q. What is a presumption of fact? A. An inference or inferences as to the existence of a fact derived from some other fact or facts.

259. Q. Name the general rules governing the admission of testimony. A. 1. The evidence must be relevant. 2. The burden of proof of guilt is always on the government. 3. The best evidence must be produced of which the case is susceptible.

260. Q. What is the species of secondary evidence known as hearsay? A. It is that kind of evidence which does not derive its value solely from the credit to be given to the witness himself, but rests also, in part, on the veracity and competency of some other person.

261. Q. Why is hearsay testimony inadmissible? A. On account of its intrinsic uncertainty growing out of the fact that it consists of matters repeated at second hand, as well as because it presumes the existence of better testimony, and because it introduces into the case statements not made under oath, the truth of which cannot be tested by the criterion of cross-examination.

262. Q. Is the wife of an accused person a competent witness before a court-martial? A. No; except in cases where the trial is for bodily injury or violence inflicted by the husband on the wife, or *vice versa*.

263. Q. What is the order of examining witnesses? A. 1. Direct examination. 2. Cross-examination. 3. Re-examination.

264. Q. What is a leading question? A. 1. One which suggests to the witness the answer desired. 2. One which embodies a material fact, admits of an answer by a simple negative or

affirmative. 3. One which in its form assumes facts to have been proved which have not been proved, or assumes that particular answers have been given which have not been given.

265. Q. How may the testimony of a witness be impeached? A. By introducing testimony that the witness has made specific statements out of court contrary to what he has testified on the stand; or by introducing testimony attacking his general reputation as a truthful person.

266. Q. In what class of cases may depositions be introduced in evidence? A. In cases not capital.

267. Q. How may the writing of a person be proved before a court-martial? A. By the testimony of witnesses having personal knowledge of the handwriting, or by the comparison of handwriting with other writings in evidence.

## CHAPTER XV.

268. Q. In voting upon a finding, with whom does the voting begin? A. With the youngest in commission.

269. Q. How is the result upon a finding determined? A. By a majority vote.

270. Q. What is the result of a tie vote upon a finding? A. It inures to the benefit of the accused and is equivalent to an acquittal.

271. Q. What are the general forms of findings upon specifications? A. Guilty or not guilty; confirming the plea; find the facts as alleged, but attach no criminality thereto; and findings with exceptions and substitutions.

272. Q. In what case may there be a conviction of a lesser offence? Give some examples. A. When the offense charged involves and contains a lesser offense as a legal part of it, and the evidence falls short of establishing the greater, but shows that the accused was guilty of the lesser offense. Absence without leave may be found under a charge of desertion. Similarly, manslaughter may be found under a charge of murder, larceny under robbery, and an attempt to commit an offense under a charge for the offense itself.

273. Q. May an accused be convicted under one Art. of War of a violation of another? A. When an accused is charged with a violation of an article making punishable a certain specific offense, he cannot legally be found "not guilty, but guilty" of some other specific offense made punishable by another article. But when the evidence fails to fix upon the accused the specific offense charged, but shows him to have committed a military neglect or disorder as involved in his act or acts, the court is always authorized to find him guilty under the 62d Art. of War.

274. Q. At what stage should previous convictions be introduced? A. Immediately after a finding of "guilty."



## CHAPTER XVI.

275. Q. What is the method of voting upon a sentence when the punishment is not mandatory? A. Each member of the court, or such members as see fit, write a sentence. These are handed to the President, who reads them to the court, and then proceeds to take its vote, commencing with the highest recommended. If this be rejected, he takes the next highest in order, and so on until one is agreed to by the proper number of members.

276. Q. What is the effect of a tie vote in voting upon a sentence? A. It is futile and determines nothing.

277. Q. Name some of the legal and appropriate punishments for officers. A. Suspension from rank, suspension from command, loss of files or relative rank, reprimand, admonition, arrest, imprisonment, loss of pay, dismissal, death.

278. Q. How many species of imprisonment are recognized in military law? A. Simple confinement, confinement at hard labor, confinement in a penitentiary, solitary confinement on bread and water.

279. Q. What is the rule laid down in the Article of War in relation to sentences of confinement in a penitentiary? A. No person in the military service shall, under the sentence of a court-martial, be confined in a penitentiary, unless the offense of which he may be convicted would, by some statute of the United States, or by some statute of the state, territory, or district in which such offenses may be committed, or by the common law, as the same exists in such state, territory or district, subject such convict to such punishment.

## CHAPTER XVII.

280. Q. In what cases does the President act as reviewing officer of courts-martial proceedings? A. 1. In cases in which he has himself convened the court. 2. In cases where the law provides that the sentences adjudged cannot be carried into execution until confirmed by him. 3. In cases arising in time of war under the 111th Art. of War.

281. Q. In cases where the law requires that the sentence adjudged shall be confirmed by an authority superior to the convening officer, what action is necessary on the part of the latter before the former can exercise the power conferred? A. The convening authority must first approve the sentence adjudged before the higher authority can act. If the former disapproves there is nothing left for the latter to act upon.

282. Q. When the record of a court-martial exhibits errors in preparation, or seemingly erroneous conclusions on the part of the court, what remedy may the reviewing authority employ? A. Under such circumstances army regulations authorize the review-

ing officer to reconvene the court for a reconsideration of its action with suggestions for its guidance.

283. Q. If a court-martial has been reconvened for the correction of errors in the record, and it finds the errors pointed out to exist, how should they be corrected? A. In addition proceedings, and without disturbing the original record by additions or erasures.

284. Q. What is the effect of an executed sentence? A. A sentence once duly approved and fully executed is conclusive and final so far as regards the reviewing authority. He cannot recall the action taken, reopen the case, or revoke, set aside, rescind, or modify the sentence. An executed sentence is also beyond the pardoning power.

285. Q. Irrespective of the pardoning power vested by the constitution of the United States in the President, by whom may the power to pardon and mitigate punishment adjudged by court-martial be exercised? A. By the officer authorized to convene the court by which the sentence has been imposed, except the punishment of death or dismissal of an officer.

286. Q. When may this power be exercised? A. At the time of the formal approval of the sentence, and at any stage of the execution of the punishment, so long as any portion of the same remains unexecuted.

287. Q. What is understood by the term of "commutation" of a sentence, and by whom may this power be exercised? A. It is a form of conditional pardon, and is applied to punishments not capable of being mitigated, i. e. reduced in amount or quantity, and form; therefore, a sentenced person can be relieved only by the substitution of other and different punishments of a milder character.

## CHAPTER XVIII.

288. Q. How many and what inferior courts-martial are known to our military law? A. Four; viz. (1), the regimental court-martial; (2), the garrison court-martial; (3), the field officers' court; (4), the summary court.

289. Q. What is the law as to the jurisdiction of these courts, and their power of punishment? A. They have no power to try capital cases or commissioned officers, and are, therefore, *legally authorized* to take cognizance of all military offenses of soldiers, provided the same are not made punishable capitally, or exclusively by a general court. But as their authority to punish is so inadequate to the proper disposition of serious and grave offenses in the case of conviction, their jurisdiction has been, in practice, confined to minor offenses. Their power to punish is limited to a fine, not exceeding one month's pay, or to imprisonment at hard labor not longer than one month.

290. Q. What limitations have been placed upon the field officers' court and the summary court? A. The former is authorized only in time of war, and the latter exclusively in time of peace.

291. Q. In what cases is the summary court barred from the adjudication of cases properly brought before it? A. When the offender objects to a hearing and determination of his case by such court and requests a trial by court-martial, and when the summary court is the accuser, the case must be heard by the post-commander or by a regimental or garrison court-martial.

## CHAPTER XIX.

292. Q. By whom and for what purpose may, under the law, courts of inquiry be instituted; how is this power limited? A. The President and any commanding officer may institute courts of inquiry for the purpose of examining into the nature of any transaction of, or accusation or imputation against, any officer or soldier. But they shall never be ordered by any commanding officer, except upon the demand by the officer or soldier whose conduct is to be inquired of.

293. Q. What is the composition of a court of inquiry? A. It shall consist of one or more officers, not exceeding three, and a recorder.

294. Q. May a member of a court of inquiry be challenged? A. Yes; but the law is silent upon the subject. The privilege is granted by the usages of the service.

295. Q. In what case and under what circumstances may the proceedings of a court of inquiry be admitted as evidence by a court-martial? A. In cases not capital, nor extending to the dismissal of an officer, and when the circumstances are such that oral testimony cannot be obtained.

## CHAPTER XX.

296. Q. What offences are specified in the three Articles of War relating to muster? A. The knowingly making a false muster of a soldier or other person, or of a put in animal; the signing, directing, or allowing the signing of a muster-roll, knowing the same to contain a false muster; and the incidental offence of taking money or other bribe, or "gratification," as a consideration for the mustering of a regiment or company, or for the signing of a muster-roll.

297. Q. What is a muster? A. The assembling, inspecting, entering upon formal rolls, and officially reporting as a component part of the command, of persons or public animals.

298. Q. What is a false muster? A. The offense consists in the including, knowingly, by an officer, at a formal muster, or

upon an official muster-roll, as a component part of his command, or of a body under his charge, of a person, as a soldier or public employé, who is not such, or of a soldier or person as present who is absent, discharged, or deceased, or of a person designated by a false name, or of a person as effective who is, in fact, disabled and ineffective, or of a public animal, which does not exist, or is not present, etc.

299. Q. What presumption governs if guilty knowledge on the part of an officer cannot be established by direct evidence? A. An officer is chargeable with the knowledge of what it is his office to know, or what he is bound to know in the performance of the particular duty devolving upon him.

300. Q. How many witnesses are required to establish the offense of false muster? A. Two.

301. Q. What offenses are made punishable by the 21st Art. of War? A. 1. The commission of a battery or of an assault upon a superior officer, while he is in the execution of his office, by striking him, drawing or lifting up a weapon menacingly against him, or offering him another form of physical violence. 2. The disobedience of the lawful order of a superior officer.

302. Q. What is the presumption as to the legality of an order given by an official superior? A. An order of an official superior, not palpably illegal upon its face, is to be presumed to be authorized and legal, and an inferior must unhesitatingly obey it.

303. Q. Define the term "mutiny." A. Mutiny is an unlawful opposition or resistance to, or defiance of, superior military authority, with a deliberate purpose to subvert or prevail over the same.

304. Q. How is the intent in a case of mutiny established? A. It may be proved from words openly declared, or it may be implied from the act or acts done. The fact of combination—that the opposition or resistance is the proceeding of a number of individuals acting together apparently with a common purpose—is the most significant evidence of the existence of the intent in question.

305. Q. Is a violent act necessary to establish mutiny? A. No. It may consist simply in a persistent refusal or omission (with the necessary intent) to obey orders, or to do duty.

306. Q. Is a combination necessary in mutiny? A. No. A single person may entertain the intent, and commit the act of mutiny.

307. Q. What is meant by sedition, as used in the Articles of War? A. An opposition or resistance by military persons to the civil authorities, demonstrated by riot or other breach of the peace.

308. Q. What duty does the 23d Art. of War impose upon an officer or soldier who is present at a mutiny or sedition, or has knowledge of an intended mutiny or sedition? A. He must use his utmost endeavor to suppress the same, and if he has knowl-

edge of an intended mutiny or sedition, he must without delay give information thereof to his commanding officer.

309. Q. What is an affray? A. A fighting or hostile contention of two or more parties in public, to the terror of the citizen.

310. Q. What is the purpose of the three Articles of War in relation to challenges to fight duels? A. They aim at preventing duelling in the army, by rendering liable to immediate arrest, trial, and severe punishment, all military persons without distinction, who send or accept challenges, or otherwise promote duels, as well as commanders of guards, who neglect to stop parties going out to fight duels, or even persons who upbraid others with refusing to accept challenges.

311. Q. What is a duel? A. A concerted fight between two parties with deadly weapons, having for its alleged object the satisfaction of wounded honor.

312. Q. What is a challenge? A. A written or verbal invitation to another—whether military person or civilian—to unite in such a combat.

313. Q. How should an officer proceed if he believes himself wronged by his regimental commander? A. He should make due application to such officer for redress, and if refused such redress he may complain or appeal to the general commanding in the state or territory where his regiment is stationed. (It is to be remarked in this connection that the word “protest,” sometimes used by officers, is a most unmilitary term, and ought to be unknown in the proper administration of military affairs.)

314. Q. Define the term “desertion.” A. Absence from regiment, station, or duty, and from the service without authority, and with the intention of not returning.

315. Q. What is necessary to establish a charge of desertion? A. 1. The fact that the accused has received pay, or been duly enlisted. 2. That he absented himself without authority. 3. That he did so with the intention not to return.

316. Q. What is the provision of the 38th Art. of War in relation to drunkenness? A. Any officer who is found drunk on his guard, party, or other duty, shall be dismissed from the service. Any soldier so offending shall suffer such punishment as a court-martial may direct.

317. Q. What is the meaning of the words “found on?” A. That the drunkenness of the offender must exhibit itself after he has entered upon and while he is on the duty, and not that he shall have become drunk, but that he shall have been discovered or perceived to be drunk when on duty.

318. Q. What does the term “duty” include? A. All descriptions and circumstances of duty.

319. Q. In the case of an officer, what is embraced in the term “military duty”? A. Every duty which an officer is legally re-

quired by superior authority to execute, and for the proper execution of which he is answerable to such authority.

320. Q. What is the provision in the Articles of War concerning the offenses of sentinels? A. Any sentinel who is found sleeping upon his post, or leaves it before he is regularly relieved, shall suffer death or such other punishment as a court-martial may direct.

321. Q. What is the provision in the Articles of War concerning misbehavior before the enemy, and pillaging? A. Any officer or soldier who misbehaves himself before the enemy, runs away, or shamefully abandons any fort, post, or guard, which he is commanded to defend, or speaks words inducing others to do the like, or casts away his arms or ammunition, or quits his post or colors to plunder or pillage, shall suffer death, or such other punishment as a court-martial may direct.

322. Q. What application has the word "whosoever" in the 45th Art. of War in relation to relieving the enemy with money, victuals, or ammunition, etc.? A. The word covers civil as well as military persons.

323. Q. What is necessary to constitute this offense? A. That the enemy must be actually relieved—reached by the succor or assistance tendered.

324. Q. When is the crime of holding correspondence with the enemy complete? A. In the writing or preparing of the letter or other communication, and the committing it to a messenger, or otherwise putting it in the way to be delivered. It is not essential that it be received by the person for whom it is intended, or that it reach its place of destination.

325. Q. Does the same rule apply to the crime of giving intelligence to the enemy? A. No. In this case it is necessary that the enemy shall have been actually informed.

326. Q. What is a safeguard? A. It signifies a special privilege of protection for person, household, or property—all or either—against military marauders, or other disorderly parties, granted by a military commander to private individuals, to corporations, or to hospitals, or other public institutions.

327. Q. Name the civil crimes of which a court-martial has jurisdiction, under the provisions of the 58th Art. of War, in time of war, when committed by persons in the military service. A. Larceny, robbery, burglary, arson, mayhem, manslaughter, murder, assault and battery with an intent to kill, wounding by shooting, or stabbing with an intent to commit murder, rape, or assault and battery with an intent to commit rape.

328. Q. What is the provision concerning the punishment to be awarded upon conviction for any of the crimes named? A. The punishment in any case shall not be less than the punishment provided for the like offense by the laws of the state, ter-

ritory, or district in which such offense may have been committed.

329. Q. What is the object of the 58th Art. of War? A. To provide in time of war for the punishment of the crimes of persons in the army in localities where, in consequence of military occupation or the prevalence of martial law, the action of the civil courts is suspended, or their authority cannot be exercised with the promptitude and efficiency required by the exigencies of the period and the necessities of military government.

330. Q. Define the crime of murder. A. Homicide with malice aforethought.

331. Q. Name and define the two kinds of malice aforethought. A. Malice aforethought is either "express" or "implied"; "express" when the intent—as manifested by previous enmity, threats, the absence of any sufficient provocation, etc.—is to take the life of the particular person killed, or to inflict upon him some excessive bodily injury which may naturally result in death; "implied," when the intent is to commit a felonious or unlawful act, but not to kill or injure the particular person.

332. Q. What is the presumption of law in every case of apparently deliberate and unjustifiable killing? A. The existence of the malice necessary to constitute murder is presumed, and devolves upon the accused the *onus* of rebutting the presumption.

333. Q. What is justifiable and excusable homicide? A. It is "justifiable" when committed by a public officer in the due execution of the laws or administration of public justice, or when committed by any person in the due prevention of a violent crime. It is "excusable" when it is the result of accident or mishap, or when it is committed in self-defense.

334. Q. Define the crime of manslaughter. A. An unlawful killing without malice aforethought, expressed or implied.

335. Q. What is voluntary and involuntary manslaughter? A. "Voluntary," when committed in a moment of excitement or while under the influence of passion, and commonly either in the course of a sudden *fighting* or upon some immediate strong *provocation*. "Involuntary," when death is caused accidentally and unintentionally, either by the doing of an act which, though unlawful, is not felonious or highly criminal or likely to be dangerous to human life; or by the doing of a lawful act in an incautious or negligent manner.

336. Q. What is "mayhem"? A. The violently inflicting, upon any part of a man's body, of such an injury as to render him less able to fight or defend himself against his adversary.

337. Q. Define "rape." A. The unlawful carnal knowledge of a woman forcibly and against her consent.

338. Q. What is robbery? A. A felonious taking of his property from the person, or presence, of another, by means of violence or putting him in fear.



339. Q. Define the crime of "arson." A. The malicious burning of the house of another.

340. Q. Define the crime of "burglary." A. An unlawful breaking and entering, in the night-time, into the dwelling-house of another, with the intent of committing a felony therein.

341. Q. Define the crime of "larceny." A. A taking of personal property from the possession of the owner, without his consent, with the intent to appropriate the same.

342. Q. What is the great principle established in our public law which regulates the relations of the military to the civil authority? A. In time of peace and on common ground the military is subordinate to the civil; and that military persons are amenable in their civil capacity to the civil jurisdiction for breaches of the criminal law.

343. Q. What Article of War has been enacted in recognition of these principles, and what is its general purpose? A. The fifty-ninth. Its general purpose is to aid the civil authorities in the administration of justice, and to place it out of the power of a criminal to escape the just civil penalties of his acts by entering the military service or claiming its protection while in it.

344. Q. What is the nature of the requirement, in this article? A. The commanding officer or other officers, in time of peace, are required to cause to be surrendered upon due application to the civil authorities, and to aid them in securing, any such military persons as may be accused of the crimes or offenses specified.

345. Q. Define "embezzlement." A. A fraudulent or unlawful appropriation of money or other property, by a person in a fiduciary capacity, to whom, in such capacity, it has been intrusted by the owner.

346. Q. In a general sense, what acts are embraced in the term "conduct unbecoming an officer and a gentleman"? A. Acts of military officers which tend to bring disgrace and reproach upon the service of which they are members, whether these acts are done in the performance of military duty, or in a civil position, or in a social relation, or in private business.

347. Q. What is the general definition of "conduct unbecoming an officer and a gentleman"? A. Action or behavior in an official capacity which, in dishonoring or otherwise disgracing the individual as an officer, seriously compromises his character and standing as a gentleman; or, action or behavior in an unofficial or private capacity which, in dishonoring or disgracing the individual personally as a gentleman, seriously compromises his position as an officer, and exhibits him as morally unworthy to remain a member of the honorable profession of arms.

348. Q. What offenses are made punishable by courts-martial under the 62d Art. of War? A. 1. Crimes not capital, i.e., not made punishable by death under the common law or by a statute of the United States applicable to the case. 2. Neglects of duty,



including evasions of and failures to fully or properly perform duty. 3. Disorders, i.e., acts of insubordination, violence, immorality, or drunken conduct, or other serious irregularity, not punishable under any other articles—provided the same are such as to be prejudicial to good and military discipline.

349. Q. What is meant by the term “good order”? A. It refers mainly to the order of the service, though, in cases of some crimes or of disorders amounting to breaches of the peace, it may be deemed to include also the order of the civil community.

350. Q. Define the term “spy.” A. A spy is a person who, without authority, secretly collects, or attempts to collect, material information within the lines of one of the hostile armies, with the design of imparting it to the other.

351. Q. Is it necessary that a spy shall be tried by a court-martial, or military commission? A. No. The military commander may proceed summarily against him and have him shot without trial, if the facts and the circumstances of the emergency are such as to warrant it.

### G. O., No. 100, of 1863.

(For Captains.)

#### SECTION I.

352. Q. What is martial law, in what does it consist, and by whom is it executed and carried out? A. Martial law is military authority exercised in accordance with the laws and usages of war in a place or district occupied by an enemy, and is the immediate and direct effect and consequence of occupation or conquest; it also exists in the commander's own country upon the theatre of war when face to face with the enemy. It consists in a hostile country in the suspension by the military authority of the criminal and civil law and of the domestic administration and government in the occupied place, and in the substitution of military rule or force for the same, as well as in the dictation of general laws, as far as military necessity requires this suspension, substitution or dictation. It is executed by military force, and whenever possible is carried out in cases of individual offenders by military court.

353. Q. What is military jurisdiction? A. It is of two kinds: 1. That which is conferred by statute; 2. That which is derived from the common law of war. Cases arising under the first are tried by courts-martial; offenses under the latter are tried by military commission.

354. Q. What does military necessity consist of? A. In the necessity of those measures which are indispensable for securing

the ends of war, and which are lawful according to the modern law and usages of war.

355. Q. Define the term "public war." A. A state of armed hostility between sovereign nations and governments.

356. Q. What is the condition of a citizen or native of a hostile country during war? A. He is an enemy as one of the constituents of the hostile state or nation, and as such subjected to the hardships of the war. But otherwise, as long as he takes no part in the war, he is entitled to protection and is as little disturbed in his private relations as the commander of the hostile troops can afford to grant in the overruling demands of a rigorous war.

357. Q. When may retaliation be resorted to? A. As a means of protective retribution, after careful inquiry into the real occurrence and the character of the misdeeds that may demand retribution.

## SECTION II.

358. Q. What is the rule as to the capture of the public property of the enemy? A. A victorious army appropriates all public money, seizes all public movable property until further direction by its government, and sequesters, for its benefit or that of its government, all the revenues of real property belonging to the hostile nation. Churches, hospitals, establishments of education, observatories, museums of fine arts or of a scientific character are not to be considered public property, liable to capture and appropriation, and should be secured against all avoidable injury and wanton destruction.

359. Q. What is the rule as to private property in the enemy's country? A. Unless forfeited by crimes or by offenses of the owner, private property can be seized only by way of military necessity for the support of the army of the United States. If the owner has not fled, the commanding officer will cause receipts to be given, which may serve the spoliated owner to obtain indemnity.

360. Q. What is the provision as to the punishment of crimes against the inhabitants of hostile countries? A. All wanton violence committed against persons in the invaded country, all destruction of property not commanded by the authorized officer, all robbery, all pillage or sacking, rape, wounding, maiming, or killing of such inhabitants are prohibited under penalty of death or other punishment as may seem adequate for the gravity of the offense.

## SECTION III.

361. Q. What is a prisoner of war? A. A public enemy armed or attached to the hostile army for active aid, who has fallen into the hands of the captor, either fighting or wounded on the field or in the hospital, by individual surrender or by capitulation.

362. Q. What other classes of persons are, when captured, regarded as prisoners of war? A. All citizens accompanying an army for whatever purpose; the monarch and members of the hostile reigning family, the chief and chief officers of the hostile government, and all persons who are of particular and singular use and benefit to the hostile army or its government.

363. Q. What is a hostage? A. A person accepted as a pledge for the fulfilment of an agreement concluded between belligerents during the war, or in consequence of war.

364. Q. What is the rule as to firing upon outposts and sentinels? A. They are not to be fired upon, except to drive them in, or when a positive order, special or general, has been issued to that effect.

365. Q. What is the rule as to the private property of prisoners of war? A. Money and other valuables on the person of a prisoner, such as watches or jewelry, as well as extra clothing, are regarded as the private property of the prisoner, and the appropriation of such valuables or money is prohibited.

366. Q. What treatment should be accorded prisoners of war? A. They are subject to confinement such as may be deemed necessary for their safety, but they are not to be subjected to other intentional suffering or indignity. They shall be fed upon plain and wholesome food whenever practicable, and treated with humanity. They may be required to work for the benefit of the captor's government, according to their rank and condition.

#### SECTION IV.

367. Q. What are partisans? A. They are soldiers armed and wearing the uniform of their army, but belonging to a corps which acts detached from the main body for the purpose of making inroads into the territory occupied by the enemy; they are entitled to all the privileges of prisoners of war.

368. Q. What is the rule as to armed enemies not belonging to the hostile army? A. Not being public enemies, they are not entitled to be treated as prisoners of war, but shall be treated summarily as highway robbers or pirates.

369. Q. What is the rule as to scouts and armed prowlers? A. Scouts or single soldiers, if disguised in the dress of the country, or in the uniform of the army hostile to their own, employed in obtaining information, if found within or working about the lines of the captor, are treated as spies, and suffer death. Armed prowlers, by whatever names they may be called, or persons in the enemy's territory, who steal within the lines of the hostile army for the purpose of committing depredations, are not entitled to the privileges of prisoners of war.

370. Q. What are war-rebels, and what is the rule as to their treatment? A. They are persons within an occupied territory

who rise in arms against the occupying or conquering army, or against the authorities established by the same. If captured they may suffer death ; they are not prisoners of war.

#### SECTION V.

371. Q. Define the term "spy." A. A spy is a person who secretly, in disguise or under false pretence, seeks information with the intention of communicating it to the enemy.

372. Q. How is a spy punishable? A. With death by hanging by the neck.

373. Q. What is a war-traitor under the laws of war? A. A person in a place or district under martial law who, unauthorized by the military commander, gives information of any kind to the enemy or holds intercourse with him.

374. Q. What is the treatment of a captured messenger? A. A messenger carrying written despatches or other messages in the territory occupied by the army to which he belongs, if armed and in the uniform of his army, is treated by the captor as a prisoner of war ; if not in uniform, nor a soldier, the circumstances connected with his capture must determine the disposition which shall be made of him. But a messenger who attempts to steal through the territory occupied by the enemy, if captured, is not entitled to the privileges of a prisoner of war.

375. Q. When does the power to punish a spy or war-traitor cease? A. When he has successfully returned to his own army. Should he afterward be captured as an enemy he is not subject to punishment for his acts as a spy or war-traitor, but may be held in closer custody as a person individually dangerous.

#### SECTION VI.

376. Q. How are prisoners of war exchanged? A. Exchanges of prisoners take place—number for number—rank for rank—command for command—with added conditions for added conditions—such, for instance, as not to serve for a certain period. Such numbers of persons of inferior rank may be substituted as an equivalent for one of superior rank as may be agreed upon by cartel, which requires the sanction of the government, or of the commander of the army in the field.

377. Q. How is communication established between belligerents in the field? And what are the rules governing the same? A. Communication is established by means of a flag of truce, but the bearer thereof cannot insist upon being admitted. During an engagement he can be admitted as a very rare exception only, and if so admitted it is no breach of faith to retain him. Firing in battle is not required to cease upon the appearance of a flag of truce. If it be discovered and fairly proved that a flag of truce has been

abused for surreptitiously obtaining military knowledge, the bearer of a flag thus abusing his sacred character is deemed a spy.

### SECTION VII.

378. Q. How may prisoners of war be exchanged from captivity? A. By exchange, and, under certain circumstances, also by parole.

379. Q. What is a parole? A. A promise of a prisoner of war by which, in consideration of certain privileges or advantages, he pledges his individual good faith and honor to do, or omit doing, certain acts.

380. Q. What are the general rules governing the giving of a parole? A. Commissioned officers only are allowed to give their parole, and only with the permission of their superior officer as long as a superior in rank is within reach. No non-commissioned officer can give his parole except through an officer. The usual pledge given in the parole is not to serve during the existing war, unless exchanged. If the government does not approve the parole, the paroled officer must return into captivity; and should the enemy refuse to receive him, he is free of his parole. No prisoner of war can be forced by the hostile government to parole himself.

### SECTION VIII.

381. Q. What is an armistice? A. The cessation of active hostilities for a period agreed upon between belligerents.

382. Q. When does an armistice become binding upon belligerents? A. From the day of the agreed commencement, but the officers of the armies are responsible from the day only when they receive official information of the evidence.

383. Q. What is necessary to carry out a stipulated armistice? A. It must be agreed upon in writing and be ratified by the highest authority of the contending parties.

384. Q. What is the effect of the declaration of an armistice without conditions? A. It extends no further than to require a total cessations of hostilities along the front of both belligerents.

### SECTION IX.

385. Q. What is the law of war as to assassination? A. It does not allow proclaiming either an individual belonging to the hostile army, or a citizen or subject of the hostile government, an outlaw, who may be slain without trial by any captor; and civilized nations look with horror upon offers of rewards for the assassination of enemies as relapses into barbarism.

## SECTION X.

386. Q. What is an isurrection? A. The rising of people in arms against their government or a portion of it, or against one or more of its laws, or against an officer or officers of the government.

387. Q. Define the term "civil war" and "rebellion." A. Civil war is war between two or more portions of a country or state, each contending for the mastery of the whole, and each claiming to be the rightful government. The term rebellion is applied to an insurrection of large extent, and is usually a war between the legitimate government of a country and portions or provinces of the same which seek to throw off their allegiance to it, and set up a government of their own.

388. Q. How are all enemies in regular war divided? A. into two classes; that is to say, into combatants and non-combatants, or unarmed citizens of the hostile government.

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## WINTHROP'S MILITARY LAW, VOL. II.

## I.

## THE LAW OF WAR.

[That portion touched upon in General Orders 100 relating to the law of war has been omitted. The text on "Reconstruction" has also been left out, as it is now of historical value only, and not a matter of instruction for officers.]

389. Q. What is the leading case in our law on the taking of personal property of our own people in time of war? Give the leading features of it. A. It is the case of *Mitchell v. Harmony*, decided by the Supreme Court of the United States. Judgment for about \$90,000 was given against Lieutenant-Colonel Mitchell of Colonel Doniphan's command, on account of the appropriation at Chihuahua in 1847, during the war with Mexico, of horses, mules, wagons and goods belonging to the plaintiff, a trader, at a time when the same, though important for facilitating the operations of the army, were not necessary for its use, and were not in danger of falling into the hands of the enemy, then more than two hundred miles distant and not advancing.

390. Q. What is meant by military government? A. The dominion exercised in war by a belligerent power over territory of the enemy, invaded and occupied by him, and over the inhabitants thereof.

391. Q. Give some instances of military government. A. In the Revolutionary War, during the occupancy by the British of Boston, New York, and Philadelphia; at Castine, Me., when taken and held by the British in 1814-15, and in the provinces of

Mexico, in the course of the conquest of the same by our forces in 1846-47.

392. Q. By whom is military government exercised? A. By the military commander under the direction of the President with the express or implied sanction of Congress.

393. Q. What has been said by the Supreme Court in relation to the power of military government? A. The governing authority may do anything necessary to strengthen itself and weaken the enemy. There is no limit to the powers that may be exerted in such case save those which are found in the laws and usages of war. In such cases the laws of war take the place of the Constitution and laws of the United States as applied in time of peace.

394. Q. Name the leading cases arising during the Mexican War in which the Supreme Court of the United States passed upon some of the features of the exercise of military government? A. The cases of *Cross v. Harrison* and *Seitenstuffer v. Webb*, in which the Supreme Court affirmed the legality of the action of General Kearney in establishing civil governments in California and New Mexico, respectively.

395. Q. What did Chief Justice Chase substantially hold in relation to the authority and jurisdiction of the courts established by military power during the occupation of the enemy's country in the late Civil War? A. He held in his address at Raleigh, N. C., in June, 1867, that the national military authorities took the place of all ordinary civil jurisdiction, or controlled its exercise. The military tribunals at that time and under the circumstances were competent to the exercise of all jurisdiction, criminal and civil, which belongs under ordinary circumstances to civil courts.

396. Q. What is martial law? A. Military rule exercised by the United States (or a State) over its own citizens in an emergency justifying it.

397. Q. What is its occasion and field? A. Martial law is confined to the locality of actual war; it can never exist when the courts are open, and in the proper and unobstructed exercise of their jurisdiction.

398. Q. What are the limitations of martial law? A. The employment of martial law has been likened to the exercise of the right of self-defense by an individual. Its occasion and justification thus is necessity. It can be continued only so long as the public exigency on account of which it was declared shall prevail.

399. Q. Give some instances illustrating the operations of martial law. A. General Jackson declared martial law in New Orleans in December, 1814, when the British forces threatened that city. President Lincoln declared the insurrectionary States subject to martial law in 1862, and caused martial law to be established in Kentucky in 1864.

400. Q. In whom is the power vested to suspend the privilege of the writ of *habeas corpus*? A. In the Congress of the United States.

401. Q. What is a military commission? A. A tribunal for the investigation and punishment of violations of the laws of war, and other offenses not cognizable by courts-martial; it is an instrumentality for the more efficient execution of the war powers vested in Congress, and the power vested in the President as commander-in-chief in time of war.

402. Q. What is the history of the military commission in our law? A. This commission was instituted by General Scott, in Mexico, in 1847, for certain crimes, ordinarily cognizable by the civil courts, committed by civilians and soldiers not then triable by courts-martial. At the same time he organized a separate tribunal, designated as the "Council of War," for the punishment of offenses peculiar to war, and especially crimes committed by members of guerilla bands. Early in the recent war these two jurisdictions were, by the practice of commanders, sanctioned by the War Department, united in one war court, for which the designation of military commission was retained.

403. Q. By whom may military commissions be constituted? A. In the absence of statutory provisions they have been in practice constituted by the same commanders as are empowered to order general courts-martial.

404. Q. What is the composition of military commissions? A. They have been commonly composed of army officers, usually from three to five members; a separate officer has been invariably detailed as judge-advocate.

405. Q. What is the jurisdiction of a military commission as to place and time? A. A military commission has jurisdiction only of offenses committed either on the theatre of war, or in a place under military government or martial law, or committed during the war, or the period of the exercise of such government or law.

406. Q. What is its jurisdiction as to persons? A. The classes who may become subject to its jurisdiction are the following: *a.* Individuals of the enemy's army who have been guilty of illegitimate warfare or other offenses in violation of the laws of war; *b.* Inhabitants of the enemy's country, occupied and held by the right of conquest; *c.* Inhabitants of places or districts under martial law; *d.* Officers or soldiers of our army, or persons serving with it in the field, who in time of war become chargeable with crimes or offenses not cognizable under the Articles of War.

407. Q. What is its jurisdiction as to offenses? A. *a.* Violations of the laws or usages of war; *b.* Crimes and offenses cognizable by the local courts, but which cannot be tried by such courts because not open or in operation; *c.* Breaches of military orders or regulations, committed by persons not triable by courts-martial under the Articles of War.



408. Q. Give an outline of the procedure of military commissions. A. In the absence of any statute or regulation concerning the proceedings of military commissions, the same are commonly conducted according to the rules and forms governing courts-martial. These war courts are, however, more summary in their action than are the courts held under the Articles of War, and as their powers are not defined by law, their proceedings will not be rendered illegal by the omission of details required upon trials by courts-martial. In practice, however, their procedure is nearly identical with that of courts-martial, and upon the hearing as well as in the judgment they substantially observe the established rules and principles of law and evidence.

409. Q. What is the power of punishment by sentence of military commission? A. Except in the cases of spies, the existing law makes no provision whatever in regard to the quality or quantity of the punishment to be adjudged by the military commission. The power of such a court to award sentence is thus practically without restriction.

410. Q. What is the rule as to an appeal from, or a revision by, a civil court of the proceedings or sentence of a military commission? A. In the Vallandigham case the Supreme Court held that the proceedings or sentences of military commissions *as such* are not subject to be appealed from to, or to be revised by, any civil tribunal.

#### CIVIL FUNCTIONS AND RELATIONS OF THE MILITARY.

411. Q. What is the provision in the constitution as to the protection of States? A. "The United States shall guarantee to every state in this Union a republican form of government, and shall protect each of them . . . on the application of the legislature, or of the executive when the legislature cannot be convened, against domestic violence."

412. Q. In what notable instance has Congress legislated under the first part of this constitutional provision? A. In the legislature of 1867, providing for the reconstruction of the insurrectionary States.

413. Q. How has the protection under the second part of this constitutional provision been effected? A. By the President ordering a sufficient military force to the disturbed district with the proper instructions for the repression of the existing violence.

414. Q. Under whom should this force act? A. Under the command and direction of the President and its own officers. But as its purpose is to aid in the execution of the laws and the restoration of the peace of the State, its action should in general, as far as practicable, be in assent with the action or views of the State authorities.

415. Q. What are the provisions of law in relation to the use of

the army for the suppression of insurrection, etc.? A. The President is authorized to employ the army, for the suppression of insurrection or rebellion against the government and the execution of the laws of the United States; as also for the purpose of maintaining the civil rights of the people of the States, when divested by violent combinations or conspiracies against the laws of the State or of the United States.

416. Q. What restriction has been placed by Congress upon the employment of the army as a *posse comitatus*? A. In an act of Congress of 1878 it has been declared to be no longer lawful to employ any part of the army as a *posse comitatus* or otherwise for the purpose of executing the laws except when expressly authorized by the constitution or public statute.

417. Q. What is the law in relation to the use of military force in the Indian country? A. The President may employ the military for the removal of intruders from the Indian country, for the prevention of the introduction therein of unauthorized persons and things, for suppressing hostilities between Indian tribes, and in making arrests of criminals.

418. Q. What constitutes Indian country? A. 1. An Indian reservation occupied by Indians; 2. Other districts so occupied to which the Indian title has not been extinguished.

419. Q. What should be the attitude of the military toward the civil community when not authorized to be employed under the constitution and laws? A. Except as and when employed and ordered under the statutes and authority heretofore indicated, the United States military are not empowered to intervene or act as such on any occasion of violation of local law or civil disorder, or in the arrest of civil criminals. Their attitude toward the civil community and the civil authorities should be a strictly neutral one.

420. Q. What is the general rule as to the amenability of the military to civil authority? A. Officers and soldiers of the army do not become relieved of their civil obligations by assuming the military character, but, as citizens or civilian inhabitants of the country, remain liable, equally with other civilians, to the jurisdiction of the civil courts for offenses against the local laws, as well as for wrongs done or responsibility incurred toward individuals.

421. Q. What is the law as to the exemption of soldiers from arrests? A. Under the Revised Statutes enlisted men are expressly exempted from arrest on civil process, except for certain debts contracted before enlistment.

422. Q. What is meant by the double amenability of a military person? A. That a military person may be amenable both to the military and the civil jurisdiction for the same act.

423. Q. What is the rule as to official and discretionary acts of officers of the army? Q. They cannot be made civilly responsi-

ble for the consequences of the ordinary and regular discharge of their official duties, and if they are invested with discretion as to the matter of the performing of an official act they cannot be held to account for such performance. Their acts, though mistaken, are in general to be presumed to be authorized and legal.

424. Q. How may a military person become amenable to the criminal jurisdiction of the United States courts? A. By becoming chargeable with the commission of a felonious crime made punishable by the statutes of the United States, or for an embezzlement of public property or money.

425. Q. What is the civil liability of public officers to the United States? A. They are liable to the United States for any pecuniary loss to the same which may be incurred by them in the course of the discharge of their public duties.

426. Q. What is the amenability of officers for acts as members of courts-martial and for executing an illegal sentence? A. They are liable to damages on the suit of the injured party when acting without jurisdiction or adjudging an illegal sentence. An officer executing the sentence of a military tribunal which was without jurisdiction, or whose proceedings or judgment were otherwise illegal, so that the sentence is invalidated, is a trespasser and liable to an action for damages on the part of the person sentenced.

427. Q. What is the rule as to the amenability of officers for alleged wrongs and injuries to inferiors? A. An officer may be sued by an inferior for an alleged illegal or excessive punishment inflicted, unreasonable measure of discipline enforced, and unauthorized arrest or confinement imposed. In such cases the civil courts have in general refused to afford relief except where the act was absolutely illegal, or where absence of probable cause for the action taken, and the existence of malice, on the part of the defendant, have been established by the evidence.

428. Q. What is the rule as to the amenability of a military person to suit by a civilian? A. An officer or soldier is liable in damages to a civilian for any transcending of authority to the detriment of the latter, however honest the motive of the act, the matter of the animus affecting only the measure of the damages. He is similarly liable for the execution of an illegal order, and this although such order was received by him from his proper superior, and was executed by him in good faith. If both superior and inferior are subjected to suit by the injured party, the former is usually held to the stricter responsibility, and a higher proportion of damages awarded against him.

429. Q. What is the liability of a military person for injuries in time of war? A. For an act done *juri belli*, or for the exercise of a belligerent right, an officer or soldier cannot be called to account in civil proceedings. But the existence of war will not justify trespasses upon the person or property of civilians or other

injuries not sanctioned by the laws or usages of war, nor will it justify wrongs done by irresponsible unauthorized parties. For such acts the officer or soldier may be made liable in damages.

430. Q. What is the liability of an officer in public contracts? A. An action will not lie against an officer of the army on a contract made by him for the United States in an official capacity, except where he has acted without authority or exceeded his authority under the same.

431. Q. Can an officer of the army be sued as garnishee or trustee for or on account of public money in his official position? A. No; money in the hands of a disbursing officer remains public funds till actually paid over to the person or persons entitled to receive it as due them.

432. Q. What is the proper procedure on the part of an officer when made a respondent in civil proceedings by the service upon him of a writ of *habeas corpus* issuing from a state or municipal tribunal and sent out by or in behalf of an enlisted man or military prisoner claiming to be discharged from military custody on the ground of illegal enlistment, or absence of jurisdiction or authority over him on the part of the military authority? A. While not required strictly to make any response or return, he should, as a matter of comity, always properly do so as far as to advise the court that he holds the petitioner by the authority of the United States as an enlisted soldier, military convict, etc., setting forth in brief the status of the individual. He should decline, however, in respectful terms to produce the body of the petitioner before the court, on the ground of its want of jurisdiction over the subject-matter, as laid down by the Supreme Court in the Tarble case. Should the state courts assume jurisdiction and actually commit the officer for contempt, he should sue out a writ of *habeas corpus* for his own release in the United States district or circuit court.

433. Q. Should a like writ be served upon an officer issuing from a United States court, what is his duty? A. To make full return to the same, setting forth all the facts of the case and the authority under which the prisoner is held, and on the return-day to appear with the body of the petitioner before the court to abide by its orders thereupon.

434. Q. When an officer or soldier is subjected to a suit or prosecution on account of an act done in the performance of official duty, what is the proper course to pursue in procuring defense and indemnification? A. Application should be made to the Attorney-General through the war department to be defended at the expense of the Government. If his application is denied he should himself make proper provisions for his defense. If the result of the litigation is a judgment against him for damages, he should apply to Congress for relief.

435. Q. When does a military person become amenable to

criminal prosecution in State courts? A. Except where the act was committed upon a reservation or other premises within the exclusive jurisdiction of the United States, an officer or soldier is liable for a criminal offense against the local law to prosecution in the courts of the State or Territory in the same manner as is a civilian.

436. Q. Name some of the restrictions placed by the statutes of the United States upon the civil rights of persons in the military service of the United States. A. Officers of the army on the active list are precluded from holding any civil office; all officers of the army, except certain retired officers, are specially precluded from holding diplomatic or consular office; all military persons, except retired officers, are prohibited from holding civil offices in the Territories, and no military person is allowed to vote in any Territory by reason of being in service therein, unless such Territory is, and has been for six months, his permanent domicile.

437. Q. Name some of the restrictions placed by State laws upon the civil rights of persons in the military service of the United States. A. The constitutions or laws of some of the States disqualify military officers in whole or in part from holding office under the State; or restrict their right to vote by declaring in effect that they shall not gain a residence or habitation for that purpose merely by being stationed therein.

438. Q. Is an officer or soldier of the army liable to taxation by a State or municipality for his personal property? A. Yes, unless he is stationed at a military post situated upon land over which the United States exercises constitutional jurisdiction. But in no event can a State or municipality legally tax the pay or allowances of an officer or soldier of the army, or the dress, uniform, equipments, horses, etc., incident to his rank or office, or required or intended to be employed by him in the military service.

439. Q. When is exclusive jurisdiction over a military post or reservation situated in a State vested in the United States? A. When such jurisdiction has been reserved by the United States upon the admission of the State, or when the State subsequently cedes its own jurisdiction, or when the State has given its consent to the purchase of the land by the United States.

440. Q. What are some of the effects of being stationed at a place over which the United States exercises exclusive jurisdiction? A. The persons stationed or commorant upon such premises become isolated, both territorially and as to their civil relations. In a political sense the land is no longer a part of the soil of the State, nor are the occupants inhabitants of the State. They are severed from the enjoyment of the rights, and from subjection to the liabilities of the citizens of the State as entirely as if they were residents of a foreign country. They have no right to vote, cannot claim the benefits of the public schools, of libraries, of the fire and police departments, etc. On the other hand, they are not

liable to taxation by the State or municipality for their personal property held on the premises, or required to perform jury duty, furnish labor on the public roads, etc., in the State; nor are they subject to the civil or criminal process of the local courts, except in so far as the right to execute the same may have been reserved to the State.

441. Q. What is the jurisdiction of the Territorial courts over a military post or reservation situated in a Territory? A. The authority of the civil officials of the Territory emanates, either mediately or immediately, from Congress. In the absence of any provisions in the legislation of Congress relating to the organization or government of a Territory, by which officers or soldiers of the army stationed therein are specially exempted from the jurisdiction of the Territorial courts or authorities, they will be amenable thereto in the same manner and to the same extent as civilians, except in so far as their liability may be affected by a state of war.

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#### SUMMARY COURT.

441a. Q. What is a summary court? A. A court of justice composed of the officer next in rank to the commanding officer of a post for the summary punishment of light offenses committed by enlisted men.

441b. Q. What is the extent of punishment that may be awarded by a summary court? A. It cannot exceed that authorized for the Garrison Court-martial.

441c. Q. How and where are the records of a summary court kept? A. They are kept in a book provided by the Government for the purpose at the headquarters of each military post.

441d. Q. Can a soldier decline to be tried by a summary court? A. He has the right, if he so desires, to request to be tried by a court-martial.

## ARTICLES OF THE GENEVA CONVENTION.

The Convention between the United States, Baden, Switzerland, Belgium, Denmark, Spain, France, Hesse, Italy, Netherlands, Portugal, Prussia, Wurtemberg, Sweden, Greece, Great Britain, Mecklenburg-Schwerin, Turkey, Bavaria, Austria, Russia, Persia, Roumania, Salvador, Montenegro, Servia, Bolivia, Chili, Argentine Republic, and Peru; with additional articles: for the amelioration of the wounded in armies in the field; concluded August 22, 1864; acceded to by the President March 1, 1882; accession concurred in by the Senate March 16, 1882; proclaimed as to the original convention, but with reserve as to the additional articles, July 26, 1882; commonly known as the Geneva Convention, is as follows:

## ORIGINAL CONVENTION.

ARTICLE I. Ambulances and military hospitals shall be acknowledged to be neuter, and, as such, shall be protected and respected by belligerents so long as any sick or wounded may be therein.

Such neutrality shall cease if the ambulances or hospitals should be held by a military force.

ART. II. Persons employed in hospitals and ambulances, comprising the staff for superintendence, medical service, administration, transport of wounded, as well as chaplains, shall participate in the benefit of neutrality, whilst so employed, and so long as there remain any wounded to bring in or to succor.

ART. III. The persons designated in the preceding article may, even after occupation by the enemy, continue to fulfil their duties in the hospital or ambulance which they serve, or may withdraw in order to rejoin the corps to which they belong.

Under such circumstances, when these persons shall cease from their functions, they shall be delivered by the occupying army to the outposts of the enemy.

ART. IV. As the equipment of military hospitals remains subject to the laws of war, persons attached to such hospitals cannot, in withdrawing, carry away any articles but such as are their private property.

Under the same circumstances an ambulance shall, on the contrary, retain its equipment.

ART. V. Inhabitants of the country who may bring help to the wounded shall be respected, and shall remain free. The generals of the belligerent powers shall make it their care to inform the inhabitants of the appeal addressed to their humanity, and of the neutrality which will be the consequence of it.

Any wounded man entertained and taken care of in a house shall be considered as a protection thereto. Any inhabitant who shall have entertained wounded men in his house shall be exempted from the quartering of troops, as well as from a part of the contributions of war which may be imposed.

ART. VI. Wounded or sick soldiers shall be entertained and taken care of, to whatever nation they may belong.



Commanders-in-chief shall have the power to deliver immediately to the outposts of the enemy soldiers who have been wounded in an engagement, when circumstances permit this to be done, and with the consent of both parties.

Those who are recognized, after their wounds are healed, as incapable of serving, shall be sent back to their country.

The others may also be sent back, on condition of not again bearing arms during the continuance of the war.

Evacuations, together with the persons under whose directions they take place, shall be protected by an absolute neutrality.

ART. VII. A distinctive and uniform flag shall be adopted for hospitals, ambulances, and evacuations. It must, on every occasion, be accompanied by the national flag. An arm-badge (brassard) shall also be allowed for individuals neutralized, but the delivery thereof shall be left to military authority.

The flag and the arm-badge shall bear a red cross on a white ground.

ART. VIII. The details of execution of the present convention shall be regulated by the commanders-in-chief of belligerent armies, according to the instructions of their respective governments, and in conformity with the general principles laid down in this Convention.

#### ADDITIONAL ARTICLES.

ARTICLE I. The persons designated in Article II of the Convention shall, after the occupation by the enemy, continue to fulfil their duties, according to their wants, to the sick and wounded in the ambulance or the hospital which they serve. When they request to withdraw, the commander of the occupying troops shall fix the time of departure, which he shall only be allowed to delay for a short time in case of military necessity.

ART. II. Arrangements will have to be made by the belligerent powers to insure to the neutralized person, fallen into the hands of the army of the enemy, the entire enjoyment of his salary.

ART. III. Under the conditions provided for in Articles I and IV of the Convention, the name "ambulance" applies to field-hospitals and other temporary establishments which follow the troops on the field of battle to receive the sick and wounded.

ART. IV. In conformity with the spirit of Article V of the Convention, and to the reservations contained in the protocol of 1864, it is explained that for the appointment of the charges relative to the quartering of troops, and of the contributions of war, account only shall be taken in an equitable manner of the charitable zeal displayed by the inhabitants.

ART. V. In addition to Article VI. of the Convention, it is stipulated that, with the reservation of officers whose detention might be important to the fate of arms and within the limits fixed by the second paragraph of that article, the wounded fallen into the hands of the enemy shall be sent back to their country, after they are cured, or sooner if possible, on condition, nevertheless, of not again bearing arms during the continuance of the war.



## PART III.

### *FIELD ENGINEERING.*

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TEXT-BOOK—*Manual of Field Engineering.*

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FOR SECOND LIEUTENANTS—Nos. 442-599.

FOR FIRST LIEUTENANTS—Nos. 442-599.



## PART III.

### *FIELD ENGINEERING.*

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#### ELEMENTARY FIELD ENGINEERING.

442. Q. What is the object of fortification? A. To strengthen ground on which it has been decided to await an attack.

443. Q. In what manner does fortification strengthen a party on the defensive? A. It economizes the numbers of the defenders, and enables the force available for offensive movements to be swelled.

444. Q. State briefly the general principles involved in fortifying a position? A. 1. Choice of ground; 2. Clearance of ground; 3. Provision of cover; 4. Creation of obstacles; 5. Improvement of communications.

445. Q. In what manner are engineers attached to other troops? A. One company to each division; four companies and a field park to an army corps.

446. Q. What thickness of earth may be considered proof against rifle bullets at any range? A. Three feet.

#### CLEARING THE GROUND.

447. Q. To what extent should ground be cleared in front of a defensive position? A. For at least 300 yards, and, if possible, to the extreme limits of fire.

448. Q. In felling trees to clear the ground, how should they be attacked? A. On the side on which they are required to fall, a rope being employed if necessary to pull them over. When the tree has been cut into as far as the centre, the workman should change to the opposite side, and cut four or five inches above the former cut.

449. Q. What should be done with large trees when felled? A. They must be lopped, to prevent their acting as a cover for an advancing force.

450. Q. How should brushwood (say about 1 inch in diameter) be removed? A. By deploying troops at 5 paces apart.

451. Q. What should be done with tall grass, corn, or weeds, hedges, hollows, etc. ? A. Tall grass or corn or weeds should be trampled down by men in line, cut down or burned ; hollows should be filled up by débris or abatis ; hedges parallel to the front must be removed ; walls must be knocked down.

#### HASTY ENTRENCHMENTS.

452. Q. What are considered as hasty entrenchments ? A. 1. Cover for skirmishers, shelter-pits and rifle-pits ; 2. Cover for shooting-line, supports and reserves, shelter-trenches, breastworks and epaulments ; 3. Cover for artillery, gun-pits and gun-epaulments.

453. Q. For what purpose is a shelter-pit used and what are its dimensions ? A. For the shelter of one man ; 6 feet long and from 2 feet 3 inches to 3 feet broad.

454. Q. What are rifle-pits, and for what purpose used ? A. They are merely shelter-pits of a somewhat stronger type, used in positions of importance where a very limited range of fire is required.

455. Q. Where are shelter-trenches usually located ? A. The top of the steepest slope.

456. Q. What should be provided for men in all cases where they are to fire from shelter-trenches ? A. They should have cover for their heads, by giving extra height to the parapet between every two rifles, or, better still, by loopholes.

457. Q. How may loopholes be formed in hasty entrenchments ? A. By placing a bullet-proof log on the crest, resting on sand-bags or stones, leaving a space underneath to fire from ; by blinded loopholes, made by covering the opening with a layer of brushwood and earth ; or sand-bag loopholes, made of four sand-bags, the smallest part of the splay towards the enemy, the bags being well filled and beaten, and the two lower ones placed on edge.

458. Q. How may cover for guns be obtained ? A. By sinking them in a pit, or covering them by an epaulment.

459. Q. In what cases should pits and epaulments be constructed ? A. The pit would be used when the top surface of the ground is soft and no natural cover exists, as in a plowed field. The epaulment where existing banks can easily be modified into the requisite epaulments, or where the natural surface of the ground is hard and well adapted for working the guns.

460. Q. Wherein is the epaulment better than the pit ? A. In the latter the gun cannot be brought into action until the pit is completed ; while in the former, fire can be opened at any moment, the construction of the epaulment even going on while the gun is in action.

## OBSTACLES.

461. Q. Where, as a rule, should obstacles intended to strengthen a defensive position be placed? A. Under the effective fire of the defender, generally between 100 and 300 yards.

462. Q. What should be the conditions relative to placing obstacles? A. They should be so placed as to afford the enemy no cover, and if possible be sheltered from his artillery fire; they should be difficult to remove or surmount; they must not interfere with counter-attack.

463. Q. As an obstacle how may military pits be used? A. The shallow pits are generally covered by a glacis formed from the excavated earth. In making them the row farthest from the glacis should be excavated first, and then they must be placed checkerwise towards the enemy. A pointed picket is driven into each pit. They should, if possible be supplemented by a wire entanglement over them. Deep pits are impassable by cavalry and good protection against a night attack; but, on account of the labor involved, would be seldom used.

464. Q. What is understood by abatis? A. It is a form of obstacle made of limbs of trees firmly secured and interlaced, with the branches turned towards the enemy and pointed.

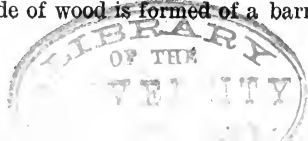
465. Q. What is the best form of abatis? A. Trees half-sawn through and dropped towards the enemy, when the trees are found in the necessary position, at the edge of woods, orchards, etc.

466. Q. What are entanglements? A. Obstacles formed by cutting trees, brushwood, etc., half-way through at a height of about 3 feet and interlacing or securing the branches by pickets to the ground. Wire may be used also for entanglements—the low wire entanglement being attached to stout stakes driven in the ground arranged checkerwise in rows, the wire crossing diagonally about 12 or 18 inches above the ground; the high wire entanglement is formed with stakes four feet above ground, the head of one stake being connected with the foot of another diagonally opposite by the wire.

467. Q. What are palisades, and how are they used? A. They are made of timbers about 10 feet long, arranged so as to form a stout open paling, and pointed or spiked at the top. They are used for the defense of ditches, and for closing the rear or gorges of partially enclosed works.

468. Q. What are fraises, and how used? A. They are palisades placed horizontally, or nearly so. If on the defender's side of the ditch, they should point downwards, and upwards if on the enemy's side.

469. Q. What is a chevaux-de-frise? A. It is a form of obstacle, and when made of wood is formed of a barrel or cylinder



from 6 to 8 feet long, with holes cut through at intervals to insert from 12 to 16 spears of 6 feet in length.

470. Q. What is a fougasse? A. Inclined holes dug in the ground, charged with powder placed at the bottom, and loaded with stones, brick-bats, or live shells.

#### DEFENSE OF POSTS.

471. Q. What constitutes the important features of defending walls? A. A most important thing is to render them useless to the enemy; this may be done by making a banquette or staging so as to raise the defender's rifle six feet or more above the ground outside; by placing obstacles in front; or by sinking a ditch outside which shall keep the enemy six feet below the top of the wall, or the bottom of the loopholes.

472. Q. How may hedges be defended? A. A hedge with a ditch on the defender's side can be used as it stands, the ditch being improved if necessary. To defend a hedge with a ditch on the enemy's side, deepen the ditch, and if possible throw earth to defender's side to give cover; if not possible, scatter it about and dig trench in rear. To defend a hedge with a ditch on both sides, deepen ditch on the enemy's side, utilize earth to obtain cover. To defend a hedge on sloping ground, gain cover by a small trench in rear, and scarp away the ground in front.

473. Q. What is the natural defense of a wood? A. An abatis or entanglement along the edge; if the whole front cannot be thus prepared for lack of time, the salients should be first prepared, and the flanks of the abatis turned back for a short distance into the wood. Roads entering the wood should be barricaded by a detached abatis and the communication preserved.

474. Q. With reference to the defense of a wood, where is the best position for artillery? A. Outside of it.

475. Q. What should be done regarding a wood too far to the front to be occupied, but within range of the line of the defense? A. An abatis should be constructed on the near side to hinder the enemy's egress from it.

476. Q. In making use of a building for defense, except in cases where it is under heavy artillery fire, how should it be prepared? A. Cover in the vicinity should be cleared away as far as time and means will allow; inhabitants and all combustible materials should be removed; water should be provided; doors and accessible windows should be barricaded; inaccessible windows should be masked and glass removed; loopholes should be made in doors, shutters, and walls, also in eaves of sloping roof; communications should be opened throughout, and a means of retreat prepared.

477. Q. What are the materials most likely to be useful in preparing a building for defense? A. Sand-bags and stout timbers,

large boxes, chests, etc. Furniture and bedding is good for masking windows of upper floors.

478. Q. How is stockading constructed? A. By placing timbers, rails, etc., either horizontally or vertically.

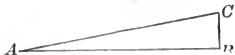
479. Q. How are vertical stockades constructed? A. By planting rows of timber in the ground close together, so as to keep out rifle-bullets, and loopholed at intervals; the timbers must be sunk 3 or 4 feet into the ground, according to size and weight, and be pointed or spiked at the top. A ribband must be spiked along inside, near the top, to keep the timbers together.


480. Q. Why should the rear of an advance post, whether farm or village, within range of the main line of defense, be left weak and open? A. Not alone to facilitate retreat, but to render easy of recapture.

481. Q. How should the successive lines of defense in a salient village be constructed? A. They should be carried well out into the country on either side and strengthened at the flanks, to avoid having them turned and necessarily fighting in the streets.

#### FIELD GEOMETRY AND FIELD LEVEL.

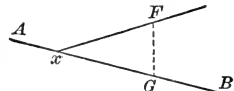
482. Q. How are slopes usually described? A. By fractions, in which the numerator expresses the height and the denominator

the base of the slope. Thus, ; the vertical height  $BC$  is  $\frac{1}{6}$  part of the horizontal distance  $AB$ . The slope  $AC$  would therefore be called a slope of  $\frac{1}{6}$  (verbally one in six). A slope in which the vertical height is greater than the horizon-

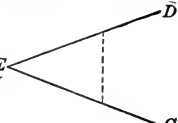
tal is thus expressed: ; the vertical height  $BC$  is four

times as great as the horizontal distance  $AB$ . The slope  $AC$  is called  $\frac{4}{1}$  (verbally four in one or four over one).

483. Q. In what manner may an angle be laid out equal to a

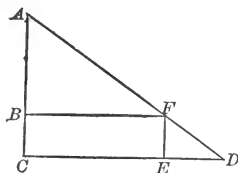
given angle? A. . Let  $x$  be the point in the

straight line  $AB$  from which it is desired to lay off an angle

equal to the angle  $DEC$  . Fix the points  $D$  and

$C$  at any convenient distance from  $E$ , and from the point  $x$  measure  $xG$ , equal to  $EC$ . Then from the point  $x$  as centre and a distance equal to  $ED$  as radius, and from the point  $G$  as centre and a distance equal to  $CD$  as radius, describe arcs intersecting at  $F$ . Join  $xF$ . The angle  $FxG$  is equal to the given angle  $DEC$ .

484. Q. How would you find the distance between any two points  $A$  and  $B$  when it cannot be measured directly? A. Take



a point  $C$  in the same straight line with  $A$  and  $B$ , and from this point lay off the line  $CD$  at any convenient angle. Take a point  $E$  in this line at a convenient distance from  $D$ , and lay out the angle  $DEF$  equal to the angle  $DCA$ . Make  $EF$  of such length that the point  $F$  is in the same straight line with  $A$  and  $D$ . Then  $AC : CD :: FE : ED$ ,

and  $AC = \frac{CD \times FE}{ED}$ . From the result found

subtract the distance  $BC$ . The remainder will give the distance from  $A$  to  $B$ .

485. Q. What is the service field level used for? A. For laying out angles on the ground and for measuring slopes.

486. Q. How is the use of the field level best learned? A. By actual handling.

#### DELIBERATE ENTRENCHMENTS.

487. Q. For what are deliberate entrenchments used? A. For the prolonged occupation of important points and positions. They must protect their defenders against both artillery and infantry fire, and sometimes be spacious enough to afford both day and night accommodations for their garrisons.

488. Q. What are the fronts, sides, and rear of a work called? A. The fronts are called faces, the sides flanks, and the rear the gorge.

489. Q. Explain the difference between a redoubt and a redan. A. A work wholly inclosed is called a redoubt, and a small two-sided work to fire to the right and left front is called a redan.

490. Q. What is a lunette? A. A work firing both to the front and flanks, and having two faces and two flanks.

491. Q. Define the angles of a work. A. An angle projecting outwards is called a salient angle; one projecting inwards, a re-entering angle.

492. Q. Give the technical terms used in connection with the profile of a work. A. The glacis, escarp and counterscarp, berme, exterior slope, superior slope, interior slope, tread of banquette, slope of banquette, steps, and interior trench.



493. Q. On what does the height of the interior crest above the plane of sight of a work depend? A. On the lay of the ground and the amount of cover required.

494. Q. On what does the thickness or horizontal distance between the interior and exterior crests of a work depend? A. On the artillery power of the enemy—20 feet to resist siege guns, 10 feet for field guns, and 3 feet for musketry.

495. Q. In what proportion does earth increase by excavation? A. One twelfth in volume; in excess at salients and deficient at re-entering angles.

496. Q. What is understood by defilading a work? A. It is to so arrange the heights of its parapets that the defenders may be screened from view and from fire in all parts of the work.

497. Q. How is a defilade much assisted? A. By a judicious choice of position.

498. Q. As parapets alone rarely suffice to defilade the whole interior of an extensive work, how must they be supplemented? A. By traverses or parados, the earth for which can either be obtained from a ditch or by lowering a foot or so the whole or a part of the interior of the work.

#### FIELD CASEMATES.

499. Q. What are field casemates? A. They are covered accommodations for troops as a protection against shell-fire and the inclemency of the weather. They are generally made from rough timbers, covered with earth, and, while rarely bomb-proof, can be easily made splinter-proof. The vertical timbers supporting the roof are generally sunk in the ground, footed on a flat slab and placed four or five feet apart; they are connected by cross-pieces, which can be strutted if necessary; on these are laid close together one or more rows of timbers, railroad iron, or fascines, and the whole covered with three or four feet of earth.

500. Q. For what purpose is brushwood used in military engineering? A. For road-making and revetting purposes, and for the construction of gabions, fascines, hurdles, baskets, etc.

501. Q. What kind of brushwood and what size is most desirable for military purposes? A. Willow, birch, ash, Spanish chestnut, and hazel when the leaf is off. It can be used up to  $1\frac{1}{2}$  inches in diameter for gabions and similar work, and up to  $2\frac{1}{2}$  inches in diameter for fascines and pickets.

502. Q. What are withes used for, and of what wood and size most suitable? A. They are used for binding purposes, and are best of pliable willow and hazel  $\frac{3}{4}$  inch in diameter.

503. Q. What is a fascine? A. A long faggot, tightly packed and carefully bound, about 18 feet long and 9 inches in diameter.

504. Q. How is a fascine made? A. It is made in a cradle of

five trestles ; the two outside trestles must be placed 16 feet apart—a line stretched between them and the other three trestles interpolated, so that the crutches are all in the same line. The brushwood, trimmed, if possible, is laid in the cradle, projecting about 2 feet beyond the outside trestles, and adjusted so that there may be no weak place. Crooked rods must be sawn half through and straightened. The fascine is then guaged with the choker, which consists of two wooden levers 4 feet long, connected at 18 inches from their ends by a chain 4 feet long, provided with two gauge rings 2 feet 4 inches apart, corresponding to the circumference of the fascine. Two men use this, standing one on each side, by placing the centre of the chain under the fascine with the short ends of the levers uppermost; cross the levers to each other over the fascine with the short ends down, and bear down on the long ends until the gauge rings meet. The binding is commenced at one end; the fascine is choked close up to the position of the binding while the latter is being put on.

505. Q. What are gabions? A. They are open cylinders, made of brushwood and used for revetments.

506. Q. For what purpose are hurdles used; in what shape are they manufactured and why? A. Hurdles are used for revetments, huts, and temporary roadways. They are generally made on a curve, and then flattened out as a safeguard against subsequent warping.

#### REVTMENTS.

507. Q. For what are revetments made and what materials are used in making them? A. Revetments are used when it is necessary to retain earth at a steeper slope than it would naturally assume. Brushwood, in the rough, or in the form of gabions, fascines, or hurdle-work; sand-bags, sods, and timber are materials that are used.

508. Q. Which is the most durable of all revetments, and when should it be used? A. Sod is the most durable if revetments are constructed in the spring, but it is a bad revetment if made in frosty or very dry weather.

509. Q. With what should a work be crowned? A. With sods or sand-bags.

510. Q. At what slope are fascines built up? A.  $\frac{1}{4}$ . Each fascine secured by four or five pickets, which should be driven at an angle into the parapet.

511. Q. How should sod be laid for revetments? A. In alternate rows of headers and stretchers, grass downwards, breaking joint, and perpendicular to the slope. The top layer should be laid with grass upwards, and all headers; they should be bedded and backed by fine earth well rammed and pickets driven through every second row.

## WORKING PARTIES.

512. Q. How should working parties be detailed relative to their organizations, and what reserve should they have? A. They should be detailed from a company, battalion, brigade, or division, according to the strength required, and not formed of detachments from different companies and corps. They should have a reserve of one-tenth necessary for the work in hand.

513. Q. In proceeding to work how should tools be carried? A. Picks and shovels are carried at the trail, the former in the left and the latter in the right hand, iron to the front and vertical. In turning, the iron of the pick must be dropped and that of the shovel raised, and when marching in file the handles must be played outwards. These precautions are necessary to prevent clatter and betray the whereabouts of the working party.

514. Q. In siege trench-work how should a large body be set to work? A. A large party must be halted at a distance and brought up in detachments, and no work commenced till the distribution of the whole party is complete, in order to prevent confusion by shifting men after work has been commenced.

515. Q. How long should reliefs work, and how far apart should the men be at work? A. Six-hour reliefs are the best. Men can work as close as 4 feet apart, but 5 feet is safer.

516. Q. How should men use the shovel in order to prevent the earth from scattering? A. In throwing the earth from the shovel the left (or right) hand must be allowed to slide freely up the handle.

517. Q. What is the responsibility of officers in connection with trench-work? A. It is the duty of superintending officers to lay out the work, adjust the tasks, conduct the distribution, and generally supervise the execution. It is the duty of company officers to see that the wishes of the superintending officers are fully complied with, and that their men execute the tasks allotted to them with all reasonable rapidity.

518. Q. What is an ordinary task of excavation? A. For an untrained workman in fair soil it is a cubic yard per hour for four successive hours. Six hours must generally be allowed for the total completion of such a task by a large working party.

## SIEGE TRENCHES.

519. Q. When regular siege is laid to a fortress, in how many ways are the trenches constructed by which access to the place is obtained? A. In three ways—by common trench-work, flying trench-work, and sapping.

520. Q. How are the working parties formed for common trench-work? A. Those forming the first relief, of a strength in the proportion of 1 man to every 2 paces of trench, with a reserve

of 10 per cent, parade in fatigue dress, with rifles slung, waist-belts, bayonets, field-belts, and at least 40 rounds of ammunition, and canteens. Each man is provided with a pick and shovel. When it is sufficiently dark to escape detection from the fortress the party is marched to within 20 yards of the point where the extension along the proposed trench is to commence, and is formed in line. The command is then given tactically for the men to form along the tape placed by the engineers. As soon as the first company is clear, the other companies follow in succession, by command of their captains. As each man gets into position he drives his pick into the ground on the *left* of his task, and lays his shovel along the front of it. He then unslings his arms, takes off his waist-belt, and lays them four paces in rear of his task, butt of the rifle towards the trench, and then lies down behind his shovel until the order is passed to commence work.

521. Q. What is the difference between flying trench-work and common trench-work? A. In flying trench-work gabions are used to revet the interior slope of the parapet, by which means cover is more easily obtained. In this case each man of the first relief carries two gabions, behind which he works, and the extension is made from single rank at 4 feet intervals.

#### ROADS.

522. Q. What should be the ordinary roadway to take a single line of vehicles, and how may this be utilized for wagons going and coming? A. Ten feet will be sufficient for a single line of vehicles, and if it is provided with sidings made at intervals can be used for vehicles passing both ways.

523. Q. When a new road has to be made, how should it be laid out? A. As straight as is consistent with the extreme gradient permissible.

524. Q. If the road passes through a wood, what will it be well to do? A. Cut down a line of trees in the required direction. The space should then be cleared of all irregularities and the tree roots grubbed up.

525. Q. How should a road slope? A. From the centre to the side at about one-thirtieth, to allow the water to drain off.

526. Q. When a road is cut on the side of a hill, how should it slope? A. Inwards toward the hill, the water being got rid of by drains at intervals, passing under the road.

527. Q. When ascending a hill by zigzags, how should the road be made? A. As level as possible at each angle and half as wide again as in the straight portions.

528. Q. How should a road be made when passing over wet or marshy ground? A. When brushwood is available, it should be made up into fascines or hurdles, or even laid loose across the road.

529. Q. When trees are plentiful, what kind of roads are the best for crossing soft or marshy places? A. Corduroy roads.

530. Q. When an army is occupying a position in which it is intended to give battle, how may temporary communications be facilitated? A. By cutting paths through woods, ramps made to ascend steep places; swampy places have fascines or brushwood laid over them, or corduroyed, and tracks made through villages by knocking down the walls, etc. Sign-posts should be put up at frequent intervals and at all cross-roads and paths.

531. Q. When troops are to march along an unknown road, what should the advance guard do? A. Mark the direction in which they are to march. Sign-posts with the words "This way" roughly written on them, or in default, wisps of straw on posts, or even heaps of stone may be used.

#### CORDAGE AND USE OF SPARS.

532. Q. How are ropes distinguished as to size? A. By their circumference in inches.

533. Q. What is the breaking weight of hemp, iron wire, and steel rope? A. The breaking weight of hemp rope in tons is  $\frac{1}{8}$  the square of the circumference in inches; that is, the breaking weight of a 2-inch rope =  $\frac{1}{8} \times 2 = 1\frac{1}{4}$  tons. Iron wire rope is about equal to the square of the circumference in inches. Steel wire rope is from 2 to  $2\frac{1}{2}$  times as strong as iron wire. In other words, the breaking weight of iron wire rope is 3 times that of hemp, and steel is 7 times that of hemp.

534. Q. Enumerate some of the principal knots and their uses. A. Thumb-knot, for preventing the end of a rope from slipping through a block; reef-knot, for joining two ropes of the same size; draw-knot, like a reef, but can be cast off from a distance by pulling on the bight; round-turn and two half hitches, for securing a rope, such as the end of a guy to a picket; sheep-shank, for shortening a rope without cutting it; clove-hitch, for fastening a rope to a spar; timber-hitch, used for foot-ropes and for hauling spars, in which case a half hitch is added near the end; hawser-bend, for joining large cables; bow-line, for making a loop which will not slip.

535. Q. How should a block be lashed to a spar? A. The back of the hook is laid against the spar, a clove-hitch is taken around the spar above the hook; then several turns around the hook and spar, and some more turns round the spar below the hook, finished off with two half hitches.

536. Q. What is meant by mousing? A. Taking some turns around the hook of a block with spun yarn or very light lashing after the hook is lashed to the spar.

537. Q. For what are blocks used, and what does a combination

of two or more form? A. Blocks are used for changing the direction of ropes; in combination they form a tackle.

538. Q. What are snatch-blocks? A. They are single blocks with an opening in the strap on one side to admit a rope without passing its end through.

539. Q. What is the meaning of overhaul, round in, and chock? A. Overhaul is to separate the blocks; round in is to bring them closer together, and chock is when the blocks are brought together.

540. Q. Describe a crab or field capstan. A. It is made of wood, and has vertical and slightly conical drum and is worked by capstan bars.

541. Q. What is a winch? A. It is usually made of iron; has a horizontal drum, worked by handles.

542. Q. What is a derrick? A. A single spar set up with four guys, secured with a carrick bend; a tackle is lashed to the head for raising and swinging weights into position. The belaying points for the guys should be at a distance from the foot of the derrick equal to twice its height.

543. Q. How should lifting jacks be used? A. When lifting heavy weights, they should be used vertically and in pairs and the weight should be blocked up as it is raised.

#### BRIDGES.

544. Q. What materials are usually available for the construction of bridges in the field? A. Timber, hemp and wire rope, railway iron, spikes, dogs, and light iron forgings.

545. Q. How many distinct types of bridges enter into military operations? A. Three: bridges on dry land, restoration of railway bridges, and floating bridges.

546. Q. How should the roadway of a bridge be constructed as regards level? A. It is generally constructed with a slight rise to the centre of the bridge to allow for subsequent settlement.

547. Q. What is the officer superintending the construction of a bridge responsible for? A. That it is strong enough to support the weight it is intended to carry. To prevent it being overstrained, a signboard should be placed at either end stating the greatest permissible load, such as, "Bridge to carry infantry in fours," "Bridge to carry infantry in file," "Bridge to carry guns not heavier than 12 pounds," etc.

548. Q. Give the technical terms of the various timbers used in the construction of a trestle bridge and their uses. A. Trestles, formed by lashing a ledger near the base of two standards, which have diagonal braces. A transom is then lashed to the two standards of the trestle just above the braces. Longitudinal baulks in their turn rest on the transverse transoms. Chesses

are then placed across the width of roadway, resting on the baulks.

549. Q. If there are five baulks in a roadway, why should each baulk be calculated to bear only one quarter of the whole weight? A. Because the two outside baulks are supposed to do only half the work of the centre ones.

550. Q. When bottom can be touched throughout, what is the best form of bridge to construct? A. A trestle bridge, it being the most economical of material and the easiest of construction.

551. Q. If the gap to be bridged partakes of the nature of a chasm, with no available bottom, what kind of bridge should be constructed? A. A frame bridge, which is the engineer's substitute for an arch.

552. Q. If timber of sufficient length for a frame bridge is not available, what must be done? A. A tension or suspension bridge must be used.

553. Q. How may trestles be placed if it is impossible to do so by hand? A. They can be boomed out in succession from the head of the bridge by lowering them down inclined baulks.

554. Q. What advantages do tripod trestles possess? A. They utilize light material, will stand without bracing and admit of more ready adjustment, raising or lowering of the roadway than either of the other forms; they are, however, unsuitable for an uneven bottom, and extremely difficult to place except by hand.

555. Q. How many classes of frame bridges are used? A. Four: the single lock, double lock, single sling, and treble sling.

556. Q. What points must be observed when reconnoitering a river with a view to effecting a passage? A. The nature of the banks; the nature of the bed; position and depth of fords; strength of the current; whether tidal or otherwise; probability and extent of floods.

557. Q. At what depths are rivers fordable? A. For infantry, 3 feet; cavalry, 4 feet; wagons containing ammunition, 2 feet 4 inches.

558. Q. Why are gravelly bottoms of rivers better than sandy bottoms? A. Because the sand gets stirred up and the depth of water increases.

559. Q. How should fords be marked? A. By long pickets driven into the river-bed above and below the ford, their heads being connected by a strong rope. The pickets should be marked, so that any rise of the river might at once be noted.

560. Q. Where is the depth of a river generally most uniform? A. In straight parts; at bends the depth will generally be greater at the concave bank.

561. Q. What is the simplest plan of measuring the velocity of a stream? A. Use a light rod weighted at one end, so as to float nearly vertically with its tip above water. Note the distance it



floats in a given number of seconds ; then seven-tenths the mean number of feet a second gives the number of miles an hour.

562. Q. Failing fords, how is the passage of a river effected ? A. By ferrying or the construction of a bridge.

563. Q. What is a flying bridge ? A. One in which the action of the current is made to move a boat or raft across the stream by acting obliquely against its side, which should be kept at an angle of 55 degrees with the current.

564. Q. What kind of boats are the best for flying bridges ? A. Long, narrow, deep boats with vertical sides, to which lee-boards can be attached.

565. Q. What points must be attended to in selecting sites for a floating bridge ? A. Proximity to a road ; the bed of the river, to afford good holding-ground for anchors if required ; a possible use of islands in the river ; and the position where it can best be defended.

566. Q. Where should a bridge be located best for its defense ? A. At the re-entering bend of a river.

567. Q. How should the roadway of a floating bridge be constructed ? A. On the same general principles as trestle bridges.

568. Q. In using open boats for bridges, where should the baulks rest ? A. A central transom should be used, which can generally be done by resting a transom on the thwarts and blocking them up from underneath, thus bringing the weight directly on the keelson.

569. Q. How is the available buoyancy of a boat determined ? A. By loading it with unarmed men to such a depth as is considered safe. For bridging purposes, the number of men multiplied by 160 is the available buoyancy in pounds.

570. Q. How may the central interval between boats be determined ? A. If the number of men which the boat will sustain be divided by 4, the result will be the interval in feet at which the boats may be placed in bridge to carry infantry in fours crowded.

571. Q. How may the buoyancy of a cask be determined ? A. Multiply the contents in gallons by 10 ; the result gives a safe buoyancy in pounds.

572. Q. What is the method of forming a raft ? A. The logs should be placed side by side, thick and thin ends alternating ; they should then be strongly secured with rope, and, if possible, by cross and diagonal pieces of scantling, fastened by spikes or wooden trenails ; or the logs themselves can be connected by dogs.

573. Q. What are good substitutes for anchors for floating bridges ? A. Two or more pickaxes lashed together ; heavy weights, such as large stones or railway irons ; nets filled with stones,—these are remarkably effective on rocky bottoms.

574. Q. How is a bridge put together in rafting ? A. It is put



together in different portions or rafts along the shore, each raft consisting of two or more piers, which rafts are successively warped, rowed, or towed into their proper positions in bridge.

575. Q. In swinging how is a bridge constructed? A. The bridge is constructed entire along shore, and then swung across the stream.

576. Q. If material is scarce and heavy siege artillery has to be passed over it, what should be done? A. The bridge should be constructed of only sufficient strength for the ordinary traffic, and the guns should be warped across on rafts of sufficient strength for the purpose.

#### CAMPING ARRANGEMENTS.

577. Q. In a defensive camp what arrangements should be made as soon as the limits of the camp have been marked out? A. Shelter or other intrenchments should be prepared for according to circumstances. The troops are then told off to their respective positions, reserves detailed, pickets and outposts posted, and every precaution taken for the safety of the camp.

578. Q. How are latrines, or sinks, constructed? A. In standing camps a trench about 6 feet long and 3 feet in width (or 2 feet 6 inches will answer if the ground is hard) should be made, with a pole stretching along the front, either end resting in the forks of stakes driven in the ground and braced. Fresh dirt should be thrown into it each morning.

579. Q. What care should be exercised in locating latrines? A. They should be so placed that no filtration from them may reach the water supply.

580. Q. In a running stream where should the water be obtained? A. The men should draw water above the place for the animals, while washing, etc., should be done below, and drainage should enter below the others as far down stream as possible.

581. Q. If the supply of water is obtained from springs for a camp, how should they be made available? A. Each spring-head should be opened up and surrounded by a low puddled wall to keep out surface water. Casks or cylinders made of brushwood, like gabions, make good linings for springs.

582. Q. What kind of water should be avoided? A. That from small ponds and shallow wells.

583. Q. How may water be improved for drinking purposes? A. Muddy water may be cleared by alum; six grains per gallon are sufficient. It should be added some hours before the water is required. Tea-leaves that have been used to make tea may be put into drinking water, as they help to remove organic matter. Charcoal is an efficient purifier of water containing organic matter.

584. Q. How may water be filtered in camp? A. It may be filtered through clean sand and gravel; but this only removes suspended matter and some organic and mineral impurities. The best method is by passing it through layers of gravel, sand, and charcoal contained in casks. The layers should be as thick as possible and should be strongly compressed, so that the water takes a few minutes to pass through them; the gravel, sand, and charcoal should be thoroughly washed before being put into the casks. The layers may be prevented from intermixing by a perforated board or sheet of iron, or a layer of clean straw; a space of 6 inches is left clear at the bottom of the cask by supporting a perforated board at that height.

585. Q. When no existing source of water supply is available, how may it be found? By sinking drive-wells if furnished.

586. Q. Where should bivouacs be established? A. On ground sheltered as much as possible from the wind and within reach of wood and water.

587. Q. How should men sleep in bivouac if not compelled to lie in line of battle? A. When camp-fires are permitted they should sleep round them in a circle, with their feet to the fire. Sleeping under trees or in woods gives some protection from cold and dew. A bed of straw, leaves, or small boughs should be made to lie on; when these are not available a hollow should be scraped for the hip. A rubber blanket is an excellent article to use, either flat on the ground or covering straw, etc.

588. Q. What may be done as a protection from cold winds? A. A pile of earth, sods, stones, logs, brushwood, or anything of like character should be built up to windward.

#### HASTY DEMOLITION.

589. Q. What are the explosives available for hasty demolition? A. Gunpowder, gun-cotton, and dynamite.

590. Q. What is the relative explosive force of gun-cotton and dynamite as compared with gunpowder? A. Gun-cotton and dynamite is from 2 to 2½ times that of gunpowder.

591. Q. What is meant by tamping, and of what use is it? A. It is covering the charge over with earth or other material so as to confine the gases at the commencement of the explosion, and thus more fully develop the force.

592. Q. In what manner should gun-cotton be used? A. For small charges it is better that the whole of the charge should be dry; but if the charge be large, wet cotton is used, care being taken that the primer be thoroughly dry. Wet gun-cotton should not be used in blast-holes.

593. Q. What precautions should be taken in firing gun-cotton? A. The primer should be thoroughly dry; the charge should be in close contact with the object to be demolished; in placing the

detonator in the charge it must be inserted so far that all the fulminate is in contact with the gun-cotton.

594. Q. How should different objects be attacked in order to demolish them? A. To blow down a house, the portions of the walls between the windows; for trees, boring auger-holes and filling them with gun-cotton; in wooden bridges, the uprights of the piers; when bridges are of masonry and of a single arch, the haunches are the best points; if a bridge consist of a series of masonry arches and piers are short and thick, the haunches should be attacked, but if high and thin the charges should be placed against them.

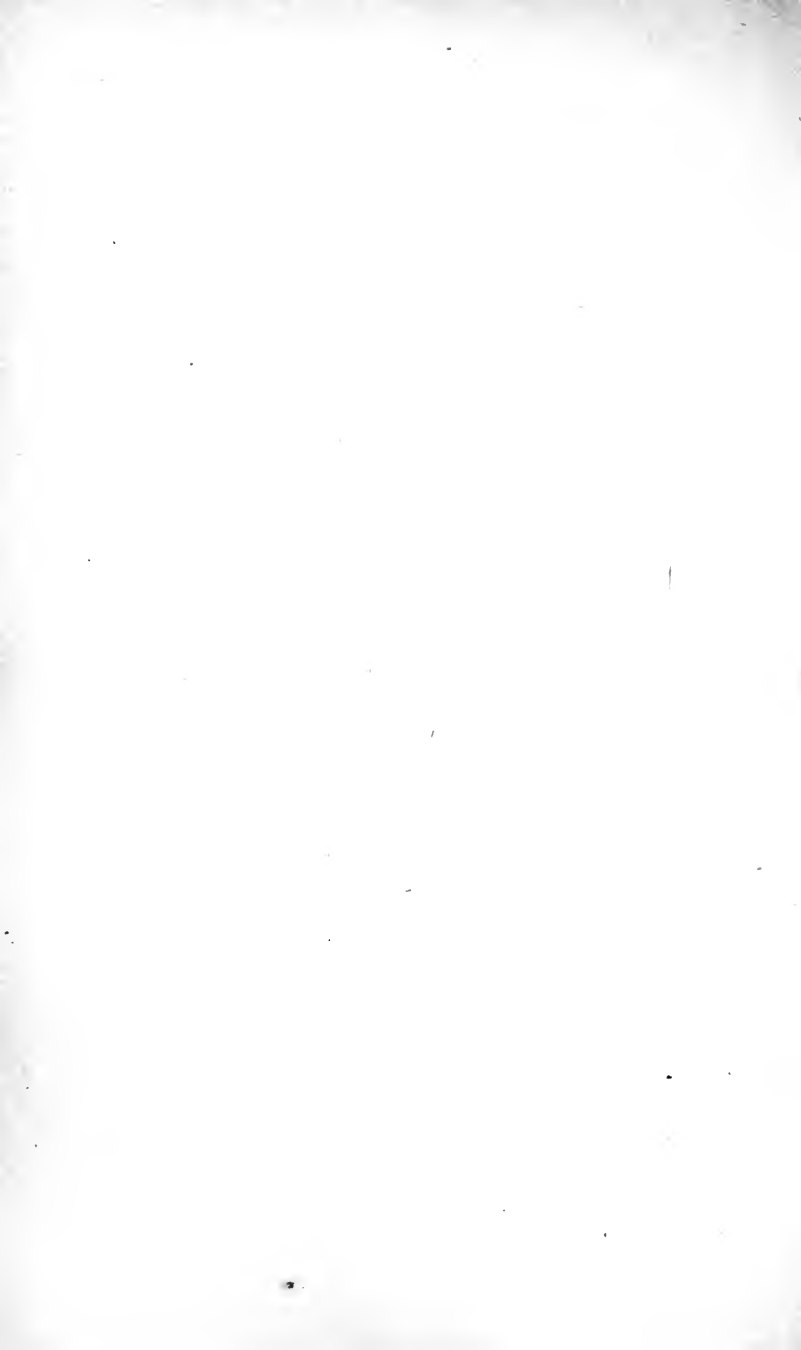
595. Q. What should be done with regard to destroying railroads? A. They should not be injured except by special order.

596. Q. How is a railroad disabled? A. Temporarily, by removing a rail or two; the outside rail on a curve is the best to select; when a railroad is ordered to be destroyed the rails should be taken up, a stack of sleepers or logs made, the rails laid across and the logs set on fire; the rails will thus be bent, and no further use can be made of them for railroad purposes. Blowing in a tunnel is a very effectual way of stopping a line.

597. Q. What should be done with regard to destroying a line of telegraph? A. It should not be injured without special orders.

598. Q. How may a telegraph line be disabled? A. By removing the instruments, by binding all the wires forming it together with fine wire, taking care to scrape them well previously till quite clean and bright.

599. Q. How may a telegraph line be destroyed? A. Cut the wires, cut down the posts, break the insulators, and break or carry off the instruments and batteries.



## PART IV.

### *SIGNALLING.*

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TEXT—*Code adopted by G. O. No. 59, A. G. O., 1889.*

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FOR SECOND LIEUTENANTS—Nos. 600-651.

FOR FIRST LIEUTENANTS—Nos. 600-651.





## PART IV.

### SIGNALLING.

#### U. S. ARMY SIGNAL AND TELEGRAPH CODE.

(Authorized by G. O. No. 59, A. G. O., June 28, 1889.)

600. Q. Give the characters used for the alphabet and numerals in the Signal and Telegraph Code. A.:

##### ALPHABET.

A ---	F ---	K ---	P ----	U ---
B ----	G ---	L ---	Q ----	V ----
C ---	H ----	M ---	R ---	W ----
D ---	I ---	N ---	S ---	X ----
E -	J ----	O -	T -	Y ----
	Z - - -		& - - -	

##### NUMERALS.

1 - - - -	3 - - - -	5 - - - -	7 - - - -	9 - - - -
2 - - - -	4 - - - -	6 - - - -	8 - - - -	0 - - - -

601. Q. Give the characters used for punctuation marks, and state how a fraction is made. A.:

##### PUNCTUATION MARKS.

Comma, - - - -	Interrogation, - - - -	Parenthesis, Pn
Semicolon, Si	Quotation, Qn	Brackets, Bx
Colon, Ko	Paragraph, - - - -	Dollar mark, Sx
Period, - - - -	Exclamation, - - - -	Dash, Dx
Hyphen, Hx	Underline, Ux	

A fraction is made by inserting a dot between the numerator and denominator—Example,  $\frac{7}{8}$ , --- - - - -

602. Q. Place opposite the following numbers the meaning when those numbers are signalled : 1, 4, 5, 7, 8, 9, 13, 18, 27, 30, 44, 73, 92, 134. A. 1. Wait a moment. 4. Start me. 5. Have you anything for me? 7. Are you ready? 8. Busy on other wires (or stations). 9. Train order (or important military message)—give way. 13. Do you understand? 18. What is the matter? 27. Adjust your magnet (or flash). 30. Circuit closed (or close station). 44. Answer quick. 73. Accept compliments. 92. Deliver (ed.). 134. Who is at the key (flag, lantern, or torch)?

603. Q. State what letters indicate certain abbreviations in the Code. A. Ahr. Another. Ans. Answer. Ck. Check. Col. Collect. D H. Dead-head. G A. Go ahead. G E. Good-evening. G M. Good-morning. G N. Good-night. G R. Government rate. N M. No more. O B. Official business. O K. All right. Opr. Operator. Pd. Paid. Qk. Quick. Sig. Signature.

604. Q. How will the flagman face when signalling? A. Exactly toward the communicating station; staff is vertical in front of centre of body, butt at height of waist.

605. Q. How is the dot, dash, and space represented? A. The dot by a motion to the right; the dash by a motion to the left of the sender; the space, whether separating elements of spaced characters or separating words will be represented by a "front" motion.

606. Q. Describe some of these motions and state what they represent. A. Right, right, front, right, represent C; right, front, right, represent O; right, right, right, front, right, represent Z; etc.

607. Q. What curvature will these motions embrace? A. An arc of  $90^\circ$ , starting from and returning to the vertical.

608. Q. How is the long dash (L and numeral 0) distinguished from the letter "T" dash? A. By a slight pause at the lowest point of dip, and with this exception there will be no pause whatever between the motions required for any single letter.

609. Q. State where pauses will be made. A. A slight pause will be made between letters. At the end of each word, abbreviation, or conventional signal, the space signal, or "front" motion is made, preceded and followed by a pause equivalent to that made between letters.

#### CONVENTIONAL SIGNALS FOR FLAG OR TORCH.

610. Q. What should each station have for the purpose, of signalling, etc.? A. Its characteristic signal or call-letter, and each operator his personal signal.

611. Q. How would you call a station? A. Signal the "call-letter" of the station wanted; or, if the call-letter be not known, signal "A" without pause until acknowledged. The calling station will then proceed with the message.



612. Q. How is a call acknowledged? A. Signal "I" three times, followed by "front" and the call-letter of the acknowledging station.

613. Q. How would you break or stop the signals from the sending station? A. Signal "A" without pause until acknowledged.

614. Q. How will the sending station be started after breaking? A. Signal "G A" followed by "front," and the last word correctly received; the sender will immediately resume the message, beginning with the word indicated by the receiver. If nothing has been received signal "R R" the sender will then repeat all.

615. Q. How is an error in sending noted? A. Signal seven dots rapidly, followed by "front," and resume the message, beginning with the last word correctly sent.

616. Q. How is the end of an address terminated? A. Signal the period followed by "front."

617. Q. How is a signature denoted? A. Signal "Sig." followed by "front."

618. Q. How do you *acknowledge receipt of a message*? A. Signal "O K" followed by "front" and personal signal or initial of receiver.

#### CONVENTIONAL SIGNALS FOR HELIOGRAPH OR FLASH LANTERN.

619. Q. How may a station be called? A. Signal the call-letter of the station wanted, or, if the call-letter be not known, signal "A" without pause until acknowledged. Both stations will then adjust, each on the other's flash. When adjustments are satisfactory, the station called will acknowledge and cut off its flash, and the calling station will proceed with the message.

620. Q. How is a call acknowledged? A. Signal "I" three times, followed by the call-letter of the acknowledging station.

621. Q. How would you *break or stop the signals from the sending station*? A. Signal "A" without pause until answered by a steady flash.

622. Q. How would you *start the sending station after breaking*? A. Signal "G A" followed by the last word correctly received; the sender will immediately resume his message, beginning with the word indicated by the receiver. If nothing has been received signal "R R," the sender will then repeat all.

623. Q. How would you note an *error in sending*? A. Signal several dots rapidly and resume the message, beginning with the last word correctly sent.

624. Q. How is an adjustment called for? A. If the receiver sees that the sender's mirror needs adjusting, he will turn on a steady flash until answered by a steady flash. When adjustment is satisfactory, the receiver will signal "O K," and the sender will resume his message.

625. Q. How is the end of an address denoted? A. By simply signalling the period.

626. Q. How is the signature denoted? A. By signalling "Sig."

627. Q. How would you *acknowledge receipt of a message*? A. Signal "O K," followed by personal signal or initial of receiver.

#### CONVENTIONAL SIGNALS FOR TELEGRAPH.

628. Q. How would you *call a station*? A. Signal the "call-letter" of the station required until acknowledged, signing at intervals the "call-letter" of the station calling.

629. Q. How is a call acknowledged? A. Signal "I" three times followed by call-letter of acknowledging station.

630. Q. How would you break the sending station? A. Open the key.

631. Q. How would you start the sending station after breaking? A. Signal "G A," followed by the last word correctly received; the sender will immediately resume his message, beginning with the word indicated by the receiver. If nothing has been received, signal "R R;" the sender will then repeat all.

632. Q. How do you denote an error in sending? A. Signal seven dots rapidly and resume the message, beginning with the last word correctly sent.

633. Q. How is the end of the address denoted? A. Signal the period.

634. Q. How is the signature denoted? A. Signal "Sig."

635. Q. How is the receipt of the message acknowledged? A. Signal "O K," followed by personal signal or initial of receiver.

636. Q. What is the order of transmitting the several parts of a message by flag, heliograph, telegraph, etc.? A. 1st. Number of message and call-letter of sending station; 2d. Operator's personal signal; 3d. The check; 4th. Place from and date; 5th. Address in full; 6th. Period (address complete); 7th. Body of message; 8th. Sig. (signature follows); 9th. Signature.

#### U. S. NAVAL CODE FOR VISUAL AND TELEGRAPHIC SIGNALLING.

(Authorized by G. O. No. 34, Headquarters of the Army, A. G. O., April 26, 1893, for use *only* in communicating with the United States Navy.)

637. Q. Give the characters used for the alphabet and numerals under this code. A.:—

ALPHABET.		
A . . . . .22	J . . . .1122	S . . . . .212
B . . . . .2112	K . . . .2121	T . . . . .2
C . . . . .121	L . . . . .221	U . . . . .112
D . . . . .222	M . . . .1221	V . . . .1222
E . . . . .12	N . . . . .11	W . . . .1121
F . . . . .2221	O . . . . .21	X . . . .2122
G . . . . .2211	P . . . .1212	Y . . . . .111
H . . . . .122	Q . . . .1211	Z . . . . .2222
I . . . . .1	R . . . . .211	

## NUMERALS.

1.....	1111	2.....	2222
3.....	1112	4.....	2221
5.....	1122	6.....	2211
7.....	1222	8.....	2111
9.....	1221	0.....	2112

638. Q. State what letters indicate certain abbreviations in the Naval Code. A. :—

## ABBREVIATIONS.

a.....after.	n.....not.	ur.....your.
b.....before.	r.....are.	w.....word.
c.....can.	t.....the.	wi.....with.
h.....have.	u.....you.	y.....why.

x x 3, "numerals follow" or "numerals end."  
sig. 3, signature.

639. Q. Give the character denoting what follows (select any of those enumerated). A. :—

End of a word.....	3
End of a sentence.....	33
End of a message.....	333
I understand.....	22.22.3
Cease signalling.....	22.22.22.333
Repeat last word.....	121.121.3
Repeat last message.....	121.121.121.3
Error.....	12.12.3
Move a little to right.....	211.211.3
Move a little to left.....	221.221.3

640. Q. Give the code-call for use for the Navy. A. :—

- A. S. U.—Action or Battle Signals Use.
- I. C. U.—International Code Use.
- T. D. U.—Telegraphic Dictionary Use.
- G. L. U.—Geographical List Use.
- G. S. U.—General Signals Use.
- C. A. U.—Cipher "A" Use.
- C. B. U.—Cipher "B" Use, etc.
- N. L. U.—Navy List Use.
- V. N. U.—Vessel's Number Use.

641. Q. What are the instructions for using the code? A. The whole number opposite each letter or numeral stands for that letter or numeral.

## TO SIGNAL WITH FLAG OR TORCH.

642. Q. How many positions and motions are used under the Naval Code? A. One position and three motions.

643. Q. What is the position to be assumed? A. The *position* is with the flag held vertically in front of the centre of the body, butt of staff at height of waist, signalman facing squarely toward the station with which it is desired to communicate.

644. Q. Describe the motions to be made under the Naval Code. A. The *first motion*, or "one" or "1," is a motion of the flag to the right of the sender, and will embrace an arc of 90°, starting with the vertical and returning to it, and will be made in a plane exactly at right angles to the line connecting the two signal stations. The *second motion*, or "two" or "2," is a similar motion to the left of the sender. To make the *third motion* "front," or "three" or "3," the flag is waived to the ground directly in front of the sender, and instantly returned to the first position.

645. Q. How must numbers in the body of a message be sent? A. They must be spelled out in full.

646. Q. How may numerals be used? A. Numerals may be used in signalling between stations having Naval Signal-books, using the Code-Calls.

647. Q. What is done in order to send a message by the Naval Code? A. "To call" a station signal its initial or "call-letter" until "acknowledged." "To acknowledge," signal "I understand," followed by its initial or "call-letter." Make a slight pause after each "letter," also after each "front."

#### FOG-SIGNALS.

648. Q. How would you apply this code to the "fog-whistle," or "fog-horn"? A. One (1) *toot* (about  $\frac{1}{2}$  second) will be "one" or "1." Two (2) *toots* (in quick succession) will be "two" or "2." A *blast* (about 2 seconds long) will be "three" or "3." The signal of execution for all tactical or drill-signals will be one (1) *long blast*, followed by two (2) *toots* in quick succession. The *ear*, and not the *watch*, is to be relied upon for the *intervals*.

649. Q. How would you signal with flash-lantern? A. Same as in fog-signals; substitute "short flash" for "toot," and "long steady flash" for "blast." The elements of a letter should be slightly longer. "To call" a station.—Make the initial or "call-letter" until "answered." Then turn on a steady flash until answered by a steady flash. The station called will "acknowledge" and cut off its flash, and the calling station will proceed with the message.

650. Q. What restrictions are placed on abbreviations under this code? A. No abbreviations will be used in the body of the message.

651. Q. How are other conventional signals designated? A. All other conventional signals are the same as for flag or torch.

## PART V.

### *DRILL—CAVALRY.*

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TEXT-BOOK—*U. S. Drill Regulations.*

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FOR SECOND LIEUTENANTS OF CAVALRY—Nos. 652-1155.

FOR FIRST LIEUTENANTS OF CAVALRY—Nos. 652-1191.

FOR CAPTAINS OF CAVALRY—Nos. 652-1234.



## PART V.

### DRILL REGULATIONS—CAVALRY.

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#### FOR SECOND LIEUTENANTS.

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#### DEFINITIONS—SIGNALS—GENERAL PRINCIPLES.

##### DEFINITIONS.

652. Q. What is an *alignment*? A. A straight line upon which several men or bodies of troops are formed or are to be formed.

653. Q. What is a *base*? A. The unit on which a movement is regulated; as, base trooper, troop, or squadron.

654. Q. What is a *column*? A. A formation in which the elements are placed one behind another.

655. Q. What is the meaning of *deploy*? A. To extend the front; as, to pass from column into line.

656. Q. What is *depth*? A. The space from head to rear of any formation.

657. Q. What is meant by *disposition*? A. The distribution of fractions of a body of troops and the formations and duties assigned to each for the accomplishment of a common end.

658. Q. What is *distance*? A. An open space in the direction of depth.

659. Q. How are distances measured? A. From the heads of horses in rank to the croups of horses posted in front of the line, and from the croups of horses in rank to the heads of the horses in rear of the line.

660. Q. How is the distance measured between two subdivisions in column? A. From the croups of the horses in front to the heads of the horses in rear.

661. Q. What is meant by *full distance*? A. Full distance is equal to the front of the subdivision, plus its interval in line, less three yards.

662. Q. What is meant by *echelon*? A. When the subdivisions are placed one behind another, extending beyond and unmasking one another, either wholly or in part.

663. Q. How is the term used in battle formations? A. To designate the different elements or lines in the direction of depth. Example: *The first echelon, the attacking line, or the firing line; the second echelon, the support, etc.*

664. Q. What is *facing distance*? A. Sixteen inches; i.e., the difference between the front of a man in rank and his depth.

665. Q. What are *file closers*? A. Officers or non-commissioned officers posted two yards in rear of the rank.

666. Q. What is the duty of file closers? A. To rectify mistakes and to insure steadiness and promptness in the rank.

667. Q. What is meant by *flank*? A. The right or left of a command in line or column; also the element on the right or left of a line.

668. Q. What are *flankers*? A. Men so posted or marched as to protect the flank of a column.

669. Q. What is meant by *flank march*? A. A march, whatever the formation, by which troops move parallel to the enemy's position.

670. Q. In estimating the front, what is the space occupied by one mounted man? A. One yard, which includes the six inches between knees.

671. Q. What is an *advance guard*? A. A body of troops marching in front of a command to reconnoiter and to protect its march.

672. Q. What is meant by *interval*? A. An open space between elements of the same line.

673. Q. How is the interval between two mounted men in line measured? A. From knee to knee.

674. Q. What is meant by *manœuvre*? A. A movement made according to the nature of the ground with reference to the position and movements of the enemy.

675. Q. What is *extended order*? A. The formation in which troopers or subdivisions, or both, are separated by intervals greater than in close order.

676. Q. What is a *pace*? A. Thirty inches.

677. Q. What is meant by *ploy*? A. To diminish front.

678. Q. What are *scouts*? A. Men detailed to precede a command on the march and when forming for battle.

679. Q. What are the duties of scouts? A. To gather and report information concerning the enemy and the nature of the ground.

680. Q. Define *tactics*. A. The art of handling troops in the presence of the enemy; i.e., applying on the battle-field the movements learned at drill.



SIGNALS.

681. Q. How are preparatory signals made? A. From the *guard*.

682. Q. What is the signal of execution? A. Return to the *guard*.

683. Q. What does the return to the carry by the instructor indicate? A. That no further signals are to be made.

684. Q. What is the signal for *Attention*? A. Raise the arm vertically to its full extent, sabre in prolongation of the arm, and describe small horizontal circles with the point.

685. Q. What is the signal for *Forward*? A. Raise the sabre, arm half extended, hand in front of right shoulder and a little higher than the head, edge up, point to the rear and higher than the hand, blade inclined about 45 degrees. Cut to the front, extending the arm to its full extent. (First and second motions of *front cut*.)

686. Q. *Right oblique*? A. Extend the arm and sabre obliquely to the right until both are horizontal.

687. Q. *Left oblique*? A. Same to the left.

688. Q. *Fours right*; or, *By the right flank*? A. Extend the arm and sabre to the right until both are horizontal.

689. Q. *Fours left*; or, *By the left flank*? A. Same to the left.

690. Q. After the preparatory signal by the instructor, what does he do in the forward, oblique, and flank marches? A. He moves his horse in the direction indicated.

691. Q. *To change direction to the right or left*? A. Raise the arm until horizontal, sabre pointing toward the marching flank; carry the arm and sabre horizontally to the front, at the same time turn the horse in the direction to be taken.

692. Q. *Fours right about, Fours left about*; or, *To the rear*? A. Turn the head and shoulder to the right and rear, bring the hand in quarte near the left breast, point to the rear and as high as the hand, edge upward. Thrust to the rear (rear point); at the same time turn the horse about in the direction the fours are to wheel.

693. Q. *To increase the gait one degree*? (Passing from a walk to a trot, or from a trot to a gallop.) A. Carry the hand to the right shoulder, sabre vertical; raise and lower the hand, keeping the sabre vertical; to be repeated several times.

694. Q. *To decrease the gait one degree*? A. Raise the hand six inches above and in front of the head and slightly in front of the right shoulder, edge of the blade up, point to the left and slightly higher than the hand. (First motion of head parry.)

695. Q. *Halt*? A. Raise the arm vertically to its full extent, sabre in the prolongation of the arm.

696. Q. *Right front into line*? A. Extend the arm to the front to its full length, the hand in quarte and as high as the

eyes, the point in front of the right shoulder and a little higher than the hilt. Lower the blade, edge to the front, making rapidly a circle around the hand, to the right of and near the horse's neck, the blade passing close to the right elbow. (Right moulinet.)

697. Q. *Left front into line?* A. Same to the left, the hand in tierce. (Left moulinet.)

698. Q. *As skirmishers?* A. Wave the sabre several times to the right and left in front of the body. When dismounted, raise both arms until horizontal, extended laterally.

699. Q. *Rally?* A. Extend the arm vertically, and rapidly circle the sabre horizontally around the head.

700. Q. *To fight on foot?* A. Raise the arm to the right and rear to its full extent, point of the sabre upward, edge to the right, body slightly turned to the right. Begin by moving the point of the sabre toward the left and describe a circle in rear. (Rear moulinet.)

701. Q. *Action right front?* A. Execute right moulinet.

702. Q. *Action left front?* A. Execute left moulinet.

703. Q. *Action right?* A. Turn the head to the right; carry the hand in quarte near the left breast, edge upward; point to the right and as high as the hand. Thrust to the right. (Right point.)

704. Q. *Action left?* A. Turn the head and shoulder to the left, draw back the hand in tierce toward the right and near the right shoulder; hand at the height of the neck, edge upward, point to the left and as high as the hand. Thrust to the left. (Left point.)

705. Q. *Cease firing?* A. A whistle-call.

706. Q. How may the signals be made when necessary? A. With the carbine or headress, or with the hand.

#### GENERAL PRINCIPLES.

707. Q. What is the habitual formation for all details, detachments, and other bodies of troops? A. Single rank.

708. Q. How may all movements on foot be executed not specially excepted? A. From the halt.

709. Q. How may all movements mounted be executed not specially excepted? A. At a trot or gallop.

710. Q. How should the gait be increased and decreased generally? A. Progressively, the trot being executed from a walk, the gallop from a trot. If marching at a gallop, the gait will be decreased to a trot, and then to a walk before halting; the halting from a trot being considered an exceptional movement.

711. Q. What is the rule for movements from the halt, or when marching at the walk, if the gait is not specified in the command? A. Movements are executed at the walk and terminate at the halt.

712. Q. If at a halt, or if marching at the walk, the command is trot, what is the rule? A. The leading unit moves at the walk until halted; the others execute the movement at the trot, and upon its completion take the walk.

713. Q. If marching at the gallop, what is the rule? A. The leading unit takes the trot; the others execute the movement at a gallop, and upon its completion take the trot.

714. Q. How many kinds of commands are there? A. Two: the preparatory, such as *Forward*, indicating the movement that is to be executed, and the command of Execution, such as *March* or *Halt*.

715. Q. How does an instructor revoke a preparatory command? A. By commanding, *As you were*.

#### ELEMENTARY DRILLS.

716. Q. Who are generally the instructors? A. Sergeants and corporals under the supervision of an officer, but the captain occasionally requires the lieutenants to act as instructors.

#### SCHOOL OF THE SOLDIER.

##### CLOSE ORDER.

717. Q. What is the object of this school? A. The instruction of the individual recruit on foot, and afterward that of the squad.

718. Q. When a movement is divided into motions, what determines the execution of the motions? A. The command of execution determines the execution of the first motion, and the commands, *Two*, *Three*, etc., that of the other motions.

719. Q. To execute a movement in detail, what is the first command of the instructor? A. He first commands, *By the numbers*.

720. Q. How are recruits taught to assemble? A. The instructor requires them to close the left hand and place the knuckles against the waist above the hip, wrist straight, back of the hand to the front; he then places them on the same line, so that the right arm of each man rests lightly against the left elbow of the man next on his right, and then directs the left hands to be replaced by the side.

721. Q. When recruits have learned how to take their places, and are required to assemble without assistance, what command does the instructor give? A. *Fall in*.

722. Q. Being at a halt, to rest the men, what commands may the instructor give? A. *Fall out*, or *Rest*, or, *At ease*.

723. Q. If marching, what are the commands? A. *Route step*, *March*; or, *At ease*, *March*.

724. Q. If the command is given to *Fall out*, what may the

men do? A. They may leave the rank, but will remain in the immediate vicinity.

725. Q. What command is given for them to resume their former places? A. *Fall in.*

726. Q. How is a squad dismissed? A. By giving the command, *Dismissed.*

727. Q. Having a squad, give the command to face to the right, and explain. A. 1. Right; 2. Face. Raise slightly the right heel and left toe and face to the right, turning on the left heel, assisted by a slight pressure on the ball of the right foot; replace the right foot.

#### SETTING UP EXERCISES.

*(The same as for Infantry.)*

#### THE STEPS.

*(The same as for Infantry.)*

#### INDIVIDUAL INSTRUCTION WITH ARMS.

728. Q. Give fully the armament of trooper for garrison duty dismounted. A. Complete armament: Carbine, pistol, and sabre. For drill and inspection, as may be directed. For duty out of rank, as orderly, witness, etc., sabre and sabre-belt. Full dress: Carbine (without sling) and cartridge-box. Undress: Carbine (without sling) and cartridge-belt; or pistol and cartridge-belt; or sabre and sabre-belt, with or without pistol. The sabre will always be worn with full dress. The sabre is not worn when in rank, except for sabre-drill, inspection of sabre, or on duty that does not require marching. Spurs are not worn on dismounted duty. The carbine-sling will be worn for drill when ordered.

729. Q. How many recruits should be instructed by one instructor, and what command does he give for them to assemble? A. Usually not exceeding four. *Fall in.*

730. Q. After falling in, what should be done to prevent accidents? A. Chambers will be opened.

731. Q. In the manual of the carbine, what is the cadence of the motions? A. It is that of quick time.

#### MANUAL OF THE CARBINE.

732. Q. What is the general rule in regard to resuming the carry from any position for the motion next to and the last in the manual? A. The motion next to the last concludes with the left hand as high as the hollow of the right shoulder, fingers extended and joined, thumb close to the forefinger, back of the hand to the front, elbow close to the body, right hand embracing

the guard with thumb and forefinger ; the last motion consists in dropping the left hand to the side.

733. Q. What is the general rule in all positions of the left hand at the sight ? A. Thumb is extended along the stock, the end of it touching the band, except in port arms.

734. Q. What is the general rule for carrying the piece with regard to the hammer ? A. The piece is habitually carried with the hammer at the safety-notch.

735. Q. Being at the order, explain (giving commands) *Carry Arms*. A. 1. Carry, 2. Arms. Raise the piece vertically with the right hand ; grasp it at the same time with the left above the right ; resume the Carry. (Two) Drop the left hand.

736. Q. Being at the Carry, explain *Order Arms*. A. 1. Order, 2. Arms. Advance the piece ; grasp it with the left hand, forearm horizontal ; let go with the right hand ; lower the piece quickly with the left ; regrasp it with the right above the sight, hand near the thigh, butt about three inches from the ground, left hand steadying the piece near the right, fingers extended and joined, forearm and wrist straight and inclined downward. (Two) Lower the piece gently to the ground with the right hand ; drop the left by the side.

737. Q. Being at the Carry, explain *Present Arms*. A. 1. Present, 2. Arms. Carry the piece with the right hand in front of the centre of the body ; at the same time grasp it with the left hand at the sight, forearm horizontal and resting against the body. (Two) Grasp the small of the stock with the right hand below and against the guard.

738. Q. How many motions are there from a *Carry* to *Right Shoulder Arm* ? A. Three.

739. Q. Being at the right shoulder, explain *Carry Arms*. A. 1. Carry, 2. Arms. Carry the butt slightly to the left and lower the piece with the right hand ; grasp it with the left at the sight, hand at the height of the chin, barrel to the rear and at the same inclination to the front as at the order. (Two) Resume the Carry. (Three) Drop the left hand.

740. Q. Being at the Carry or Order, explain *Port Arms*. A. 1. Port, 2. Arms. Raise and throw the piece diagonally across the body, lock plate to the front ; grasp it smartly with both hands, the right palm down at the small of the stock ; the left palm up, just below the sight, thumb clasping the piece ; barrel sloping to the left and crossing opposite the middle of the left shoulder, right forearm horizontal ; forearms and piece near the body.

741. Q. How many motions from a *port* to *carry arms* ? A. Two.

742. Q. From what other position can *port arms* be ordered ? A. From the right shoulder.

743. Q. What are the commands for the rest ? A. *Fall out*,



*Rest*, and *At ease*. On the march: *Route step*, *March*, and *At ease*, *March*.

744. Q. Being at the order, explain *parade rest*. A. 1. Parade; 2. Rest. Carry the right foot straight six inches to the rear; left knee slightly bent, carry the muzzle in front of the centre of the body, barrel to the left; right hand near the muzzle, muzzle between thumb and forefinger of the left hand.

745. Q. Dismiss a squad with arms. A. 1. Port, 2. Arms, 3. Dismissed.

746. Q. Being at the order, explain *kneeling*. A. Kneel. Half-face to the right, carrying the right foot so that the toe shall be about ten inches to the rear and ten inches to the left of left heel; kneel on right knee, bending the left, left toe slightly inclined to the right, right leg pointing directly to the right; weight of body resting on right heel; place left forearm across left thigh, hand hanging naturally; the piece remains in position of order arms, right hand grasping it above sight.

747. Q. Give the position of the feet at the *load*. A. Left foot as at the *Attention*, the right so that the heel is six inches to the rear and three inches to the right of the left heel; the toes of both feet turning slightly inward.

748. Q. Being in the position of *load*, give the commands for firing and continue the same. A. 1. Squad, 2. Ready, 3. Aim. 4. Fire, 5. Load, etc.

749. Q. What commands are given in teaching men to aim using the different lines of sight? A. 1. At (so many) yards, 2. Squad, 3. Ready, 4. Aim.

750. Q. What is the rule about cartridges in the instruction of a squad? A. No cartridges will be used, except when indicated in the first command of *load*, thus: 1. With dummy (blank or ball) Cartridges, 2. Load.

751. Q. Being fully armed, with carbine at the order, and the command for inspection of arms given, when are the cartridge-boxes opened? A. At the command *Arms*.

752. Q. Give the order in which the arms are inspected. A. Carbines, pistols, sabres.

753. Q. Give the position of the pistol as held for inspection. A. It is held about six inches in front of the centre of the body, barrel up, pointing to the left front and upward at an angle of about forty five degrees, wrist straight and as high as the breast.

#### SQUAD DRILL, DISMOUNTED.

Same as for infantry, including *alignments*, to *march in line*, to *march backward*, to *march to the rear*, to *march by the flank*, to *change direction*, the *oblique march*, to *march in double time*, to *pass from quick to double time* and the reverse, *turnings*, movements by *fours*, to *change direction*, movements by *twos*, and the *firings*.

MANUAL OF THE PISTOL.

754. Q. Explain the manner in which a lanyard is used. A. One end is attached to the butt of a pistol; the other end forms a sliding loop, which is passed over the head and drawn snug against the right arm-pit. The lanyard should be of just such length that the arm can be extended without constraint.

755. Q. 1. *Raise*, 2. *Pistol*. A. At the first command unbutton the holster-flap with the right hand and grasp the stock, back of the hand to the body. At the command *pistol*, draw the pistol from the holster, reverse it, muzzle up, the hand holding the stock with the thumb and last three fingers, the little finger may be placed under the butt; back of forefinger pressed against inside of the front of the guard; guard to the front; barrel nearly vertical; hand as high as the neck and six inches to the right and front of the right shoulder.

756. Q. Give the position of right foot and left hand at *raise pistol* dismounted. A. The right foot is about twenty inches to the right, and the left hand in the position of the bridle hand.

757. Q. Being mounted and at *raise pistol*, explain *lower pistol*. A. 1. *Lower*, 2. *Pistol*. At the command *pistol*, lower the pistol without changing the grasp, and rest the hand and pistol on the right thigh, back of the hand up, muzzle in front of the right knee.

758. Q. How dismounted? A. The same as mounted except the wrist rests against the right hip, back of the hand to the right; barrel inclined to the front and downward at an angle of forty five degrees.

759. Q. Being at a raise or lower pistol, give the commands for firing at an object. A. 1. *Ready*, 2. *At* (such an object), 3. *Fire*.

760. Q. What is done at the command *ready*? A. The right thumb is placed on the hammer.

761. Q. At the second command? A. Direct the eyes toward the object indicated.

762. Q. At the command *fire*? A. Thrust and point the pistol toward the objective, arm nearly or quite extended, at the same time cocking the pistol, and fire, and resume the raise or lower pistol according to the position before firing.

763. Q. Give the commands to *fire at will*. A. 1. *To the front*, etc.; or, 1. *At* (such an object); 2. *Fire at will*; 3. *Ready*; 4. *Commence firing*; 5. *Cease firing*.

THE SABRE.

764. Q. Give the normal interval and distance between men. A. Three yards.

765. Q. Being in line at a halt, give the commands to take in-

tervals to the right. A. 1. To the right take intervals; 2. March; 3. Squad; 4. Halt; 5. Left; 6. Face.

766. Q. Give commands and explain to *take distances*, being in line at a halt. A. 1. Front take distance; 2. March; 3. Squad; 4. Halt. No. 1 of each four moves straight to the front; No. 2 moves straight to the front when No. 1 has a distance of three yards; Nos. 3 and 4 move off in succession in like manner; the command *halt* is given when No. 4 has his distance.

767. Q. Form line again and explain. A. 1. Form; 2. Rank. No. 1 of each four stands fast; Nos. 2, 3, and 4 move up into their intervals and halt.

#### MANUAL OF THE SABRE.

768. Q. Give the different parts of the sabre and sabre-knot. A. Sabre: Hilt (gripe, guard, pommel, base); Blade (back, edge, point); Scabbard (bands, rings, springs). Sabre-knot (tassel, strap, sliding loops).

769. Q. When is the hand in tierce and when in quarte? A. *In tierce* when it holds the gripe back of the hand up; *in quarte*, when it holds the gripe back of the hand down.

770. Q. Explain the position of Carry Sabre. A. Back of the blade against the shoulder, edge to the front, arm nearly extended, hand by the side, elbow back, third and fourth fingers back of the gripe, left hand by the side.

#### MANUAL OF THE SABRE FOR OFFICERS.

771. Q. When dismounted, being at the carry sabre, what is done by officers at the command, *Order Arms*? A. Drop the sabre directly to the front, point on or near the ground, back of the blade to the front, thumb along the back of the gripe, back of hand to the right, arm extended.

#### SABRE EXERCISE.

772. Q. Being dismounted and at *carry sabre*, how is guard executed? A. Carry the right foot about twenty inches to the right, heels on the same line; place the left, closed, six inches from the body, and as high as the elbow, fingers toward the body, little finger nearer than the thumb (position of bridle-hand); at the same time place the right hand in tierce in front of the hip and at the height of the waist, thumb extended on the back of the gripe, little finger by the side of the others; the point of the sabre to the left, and a little higher than the hand; the blade, edge to the front, resting on the left forearm near the waist.

773. Q. Explain *right moulinet* by the numbers. A. At the command *moulinet* extend the arm to the front to its full length, the hand in quarte and as high as the eyes, the point in front of the right shoulder and a little higher than the hilt. (Two) Lower



the blade, edge to the front, make rapidly a circle around the hand, to the right of and near the horse's neck, the blade passing close to the right elbow; return to the first position. (Three) Resume the guard.

774. Q. Explain *right point*. A. At the command *point* turn the head to the right, carry the hand in quarte near the left breast, edge upward, point to the right, and as high as the hand. (Two) Thrust to the right, extending the arm to its full length, edge to the front. (Three) Resume the guard.

775. Q. 1. *Rear*, 2. *Cut*. A. Turn the head to the right, throwing back the right shoulder; carry the hand near the left breast, blade vertical, edge to the left. (Two) Extend the arm quickly to its full length and cut horizontally to the rear in tierce. (Three) Resume the guard.

776. Q. 1. *Right*, 2. *Parry*. A. Carry the hand quickly a little to the right, point of the sabre as high as the eyes and opposite the right shoulder, edge to the right so as to cover the right arm and shoulder. (Two) Resume the guard.

#### FENCING EXERCISE.

777. Q. What is the object of the *fencing* exercise, and how must all movements be executed? A. To develop the agility, intelligence, and *esprit* of the trooper, as well as his adroitness and confidence in the use of the sabre; all movements must be executed with the greatest possible quickness and lightness.

778. Q. When practicable, what should be provided for this instruction? A. Masks, wooden sabres, plastrons, and right-hand gloves.

779. Q. In the leg movements, being at the guard, explain *Advance*. A. Raise slightly and advance the right foot twice its length; follow quickly with the left the same distance.

780. Q. *Retreat*. A. Raise slightly and move the left foot twice its length to the rear; follow quickly with the right foot the same distance.

781. Q. *Left volt*. A. Face to the left, turning on the ball of the right foot; at the same time carry the left foot to its position in rear.

782. Q. How are all sabre movements (from what position) executed? A. From the *guard*, if not especially excepted.

783. Q. How are the *cuts* principally made? A. By movements of the wrist, keeping the hand in front of the body near the *line of defense* (an imaginary vertical line through the centre of the body).

784. Q. What are the principal cuts? A. *Front*, *right*, and *left*.

785. Q. Explain *Against right shoulder*, *right cut*—giving the commands. A. 1. Against right shoulder; 2. Right cut; 3. Guard. Move the point about eighteen to twenty-four inches to the left of the line of defense. (Two) Cut to the right, at the

same time extending the right arm and left leg, throwing the weight of the body on the right leg.

786. Q. In the fencing exercise mounted, when is the *engagement in tierce*? A. When a trooper has his opponent to the (his) right; and in *quarte* when to his left.

#### SCHOOL OF THE TROOPER.

787. Q. How should each mounted drill begin and end—with reference to gait? A. Begins and ends at a walk.

788. Q. Mention some of the rules that should be taught to recruits for the care of horses. A. Never threaten, strike, or otherwise abuse a horse. Before entering a stall, speak to the horse gently and then go in quietly, etc. (See par. 256, Drill Regulations.)

789. Q. How many thicknesses is a saddle-blanket folded into preparatory to placing it on a horse? A. Six.

790. Q. Give the nomenclature of the saddle. A. Pommel, cantle, sidebar, quarter-straps—front and rear forming spider, spider ring, cincha, cincha-strap, cincha-ring, stirrup-loop, stirrup-strap, stirrup-tread, stirrup-hood, rings—front and rear, cantle-staple, saddle-bag stud, coat-straps, cincha-ring safes.

791. Q. What is the rule to approximate the length of the stirrup-straps before mounting? A. They are adjusted so that their length, including stirrups, is about one inch less than the length of the arm, fingers extended.

792. Q. What should be the length of the overcoat rolled for packing? A. Not more than thirty-four inches.

793. Q. Of the bed-blanket and shelter tent? A. Twenty-four inches.

794. Q. Pack the saddle? A. Overcoat rolled and strapped on the pommel; blanket, with change of underclothing inside, is rolled in the shelter-tent (the roll not more than twenty-eight inches in length, according to bulk); *nose-bag* slipped over the roll outside of the shelter-tent, on the near end, and the strap buckled over the off end; *side-lines*, when carried, to be spread over the blanket-roll, the leather ends being brought together and the whole secured by the cantle-straps; *lariat* rolled around the picket-pin and snapped into near cantle-ring; *canteen* with *cup* on strap attached to off cantle-ring; *tin-plate* or *meat-can*, *knife*, *fork*, and *spoon* in off saddle-bag; currycomb, *brush*, and *watering-bridle* in near saddle-bag. Extra ammunition and rations to be divided so as to equalize the weight in the saddle-bags. On the march the lariat to be coiled and fastened with a thong to the near cantle-ring—the free end passing under stirrup-strap and snapped into halter-ring.

795. Q. Explain the position of *stand to horse*. A. At the command, each trooper places himself, facing to the front, on the near side of the horse, eyes on a line with the front of the

horse's head, so he can see along the front, and takes the position of the soldier, except that the right hand, nails down, grasps both reins, the forefinger separating them six inches from the bit.

796. Q. The troopers standing to horse, give the command to leave the stable. A. Lead out.

797. Q. What are the commands *to mount* (without saddle)? A. 1. Prepare to mount; 2. Mount.

798. Q. What are the commands to dismount on the off side? A. 1. To the right; 2. Prepare to dismount; 3. Dismount.

799. Q. Supposing the commands be: 1. *Squad*, 2. *Mount*, what do the men do? A. They execute all that has been prescribed (at the command *Mount*) for *prepare to mount* and *mount*.

800. Q. It being dismounted, dismiss the squad. A. 1. By the right (left, or right and left); 2. Fall out.

801. Q. Being mounted, give the first mounted exercise. A. 1. Lean back; 2. Up. Lean back until the head rests upon the horse's croup; hands resting upon the thighs, toes turned in, legs kept in place. Up: Resume gradually the position of the trooper without deranging the position of the feet and legs.

802. Q. *Fourth exercise*. A. 1. Right (or left); 2. Face; 3. Front. Turn the body to the right, carry right knee toward the rear, legs astride the horse, feet pointing to the right, body erect; hands resting on right thigh. Front: Resume the position of the trooper.

803. Q. *Seventh exercise*. A. 1. Right (or left) rear; 2. Reach. Carry right hand, back up, straight to the front, fingers and arms extended and horizontal. (Two) Sweep the hand quickly by the right to the rear, keeping the arm horizontal, at the same time making a *right face* and leaning the body to the rear. (Three) Resume the position of the trooper.

804. Q. Give the tenth exercise, the trooper mounted at *turn to the left*. A. 1. Prepare to dismount; 2. Dismount. At the first command, place the right hand on the withers; seize a lock of the mane with the left hand. At the command *dismount* support the weight on the hands, turning the body to the right-about, descend lightly to the ground on the balls of the feet, bending the knees a little.

805. Q. Give the commands for the fourteenth exercise, marching. A. 1. Prepare to dismount; 2. Dismount; or, 1. To the right; 2. Prepare to dismount; 3. Dismount.

806. Q. When is a horse bit-wise? A. When he obeys the lightest pressure upon either bar.

807. Q. There being no riding-hall, how could one be made? A. By laying out a rectangular track one hundred yards long and thirty-three yards wide. Mark the corners with stakes or stones, and caution the troopers to keep within the prescribed limits.

808. Q. Give the commands to increase and diminish the rapidity of the trot. A. 1. Trot out ; 2. March. 1. Slow trot ; 2. March.

809. Q. Explain the spiral to the right. A. Marching to the right and at least seventeen yards from a corner, the commands are : 1. Spiral to the right ; 2. March. The conductor, followed by the other troopers, gradually diminishes the circle until the column is riding inward on a spiral. On approaching the centre : 1. Column left about ; 2. March. The conductor turns left about and rides outward on a spiral, and resumes the march to the right.

#### SCHOOL OF THE TROOP.

810. Q. Give the formation of the troop. A. It is formed in single rank and is divided into two, three, or four platoons, according to its strength ; the division is so made that the platoons may be of nearly equal strength.

811. Q. How many sets of fours should be in each platoon ? A. Habitually the platoons should consist of not less than four nor more than six.

812. Q. How many squads should there be in a platoon ? A. Two when there are four or more sets of fours in a platoon.

813. Q. Where is a leader of a squad placed in rank ? A. No. 1 of its right four.

814. Q. How are the squads designated ? A. Right and left squad of such a platoon.

815. Q. Give the posts of officers of a troop in line divided in two platoons. A. The captain six yards in front of the centre of the troop, the first-lieutenant two yards in front of the centre of the first platoon, and the second-lieutenant two yards in front of the centre of the second platoon.

816. Q. Give the position of the second sergeant. A. Two yards in rear of the second four from the left.

817. Q. When marching in line what does the guidon indicate ? A. The direction of the guide.

818. Q. Being in line at a halt or at a walk, give commands and explain, "To turn and advance." A. 1. Right (or left) turn ; 2. March ; 3. Guide right (left or centre). The trooper on the right turns his horse ninety degrees to the right on an arc with a radius of two yards and moves forward in the new direction without changing the speed ; each of the other troopers turns his horse thirty degrees to the right as in oblique, and, moving at a trot by the shortest line, places himself on the new line, when he resumes the gait of the pivot trooper and dresses on him.

819. Q. During the turn where is the guide ? A. It is (without command) on the pivot flank.

820. Q. If marching at a gallop, how is the movement performed ? A. The pivot takes the canter ; all the other troopers

take the canter on arriving in line ; as soon as all the troopers have arrived on the line the commands are : 1. Gallop ; 2. March ; 3. Guide (right, left, or centre).

821. Being in column of fours, twos, or troopers, give the commands to change the guide or the chiefs of platoons to the opposite flank. A. 1. Chiefs of platoons on the right (or left) flank ; 2. March.

822. Q. What is a platoon column? A. A troop in column of platoons.

823. Q. What is the distance between platoons? A. Three yards less than platoon front.

824. Q. Being in line at a halt, give commands and explain, To march in column of platoons to the front. A. 1. Right (or left) by platoon ; 2. March ; 3. Guide left (or right). The right platoon advances at a walk ; the other platoons successively execute *right half-turn*, each when the guide of the preceding platoon has advanced about half-platoon front ; each chief of platoon, on completion of the half-turn, commands : Guide left, and the platoon marches in the new direction until the left guide arrives near the trace of the leading platoon, when he commands : 1. Left half-turn ; 2. March.

825. Q. Being in column of platoons, give the command to form line to the right and halt. A. 1. Platoons right ; 2. March ; 3. Front.

826. Q. In this movement where does the guidon take post? A. On the pivot flank of the rear platoon.

827. Q. Being in column of platoon marching at a walk, give commands to form on right into line. A. On right into line ; 2. March ; 3. Front.

828. Q. Give commands of its chief and movements of first platoon. A. At the first command the chief commands : 1. Right turn. At the command march repeated by the chief the platoon turns to the right ; when it has advanced thirty yards the chief halts it and commands : 1. Right ; 2. Dress.

829. Q. Being in column of fours at a halt, give commands to form front into line of platoons in columns of fours. A. 1. Right front into line ; 2. Platoons in columns of fours ; 3. March.

830. Q. Being in line of platoons in columns of fours, marching at a walk, give commands to form line without increasing the gait. A. 1. Platoons ; 2. Right (or left) front into line ; 3. March ; 4. Troop ; 5. Halt ; 6. Left (or right) ; 7. Dress ; 8. Front.

831. Q. At what time is the command *Halt* given in the above? A. When the leading fours have advanced thirty yards.

832. Being in column of fours marching at a walk, give commands to form column of platoons without halting. A. 1. Platoons ; 2. Right (or left) front into line ; 3. Trot ; 4. March ; 5. Guide left (or right).

833. Q. Being in line of platoons in columns of fours, in march,

give commands to change direction to the left. A. Change direction to the left; 2. March.

834. Q. What are the commands of the chiefs of platoons? A. The one nearest the change of direction commands: Column left; the other chiefs command: 1. Column half-left; 2. Trot.

835. Being in line at a halt, give commands to form echelon. A. 1. Form echelon; 2. First (or fourth) the base platoon; 3. March.

836. Q. Explain the movement. A. The designated platoon marches to the front; the second platoon, at the command of its chief, moves to the front when at platoon distance from the first; the other platoons successively advance as explained for the second.

837. Q. In this movement where is the post of the captain? A. Six yards in front of the centre or right centre platoon.

838. Q. Being in columns of platoons, give commands to form oblique echelon. A. 1. Platoons; Left (or right) half-turn; 3. March.

839. Q. What are the duties of ground scouts? A. To look for information concerning the ground.

840. Q. What are the duties of combat patrols? A. To seek for information concerning the enemy.

841. Q. What qualifications should ground scouts and combat patrols have? A. Intelligence and daring.

842. Q. In actual service, what should ground scouts be furnished with? A. Wire nippers.

843. Q. As a rule, when the troop is acting alone in charging the enemy, how is it divided? A. It is divided in two or three parts—viz., into the *attacking line* and *support*; or, when the troop is of nearly full strength, into the *attacking line*, *support*, and *reserve*.

844. Q. If the attacking line, support, or reserve consist of only one platoon, who is it led by? A. By its chief.

845. Q. If it consists of two or more platoons, who then? A. By the senior chief of platoon or by the captain.

846. Q. When the *rally* or *assembly* is sounded, where does the guidon go? A. It goes at once to the position of the captain, or to the rallying or assembling point indicated by the captain.

847. Q. Who designates the attacking line, the support, and, if there be one, the reserve? A. The captain.

848. Q. The troop being at the place to take the formation for the charge, what does the captain do? A. He points out the direction or object of attack and commands: 1. To the charge; 2. March.

849. Q. What is then the command of the leader of the attacking line? A. *Gallop*.

850. Q. And of the leaders of the support and reserve? A. They caution, *Trot*.

851. Q. Describe the charge. A. The attacking line is conducted at a gradually increasing gallop; when about fifty or seventy-five yards from the object, the leader commands: Charge. All the troopers charge sabre, and the speed is increased to that of the slower horses; when near the object the leader commands: 1. Trot; 2. March; the men resume the carry sabre and take the trot; after advancing twenty or thirty yards the leader commands: 1. Walk; 2. March; and soon thereafter: 1. Platoon; 2. Halt. When the support has a distance of about eighty yards from the attacking line it takes the gallop and follows the movement of that line; when it arrives at the proper distance it charges to support the first line. The reserve follows the support at a distance not greater than one hundred and fifty yards, unless otherwise ordered by the captain, and charges when at the proper distance.

852. Q. How does the troop in the squadron charge? A. On the same principles as when acting alone, except that it does *not* have a support or reserve, unless so ordered by the major.

#### SCHOOL OF THE SQUADRON.

853. Q. How many troops constitute a squadron? A. Two and not more than four.

854. Q. What is the interval between troops in line? A. Eight yards.

855. Q. In forming the squadron how are troops arranged? A. According to the rank of captains; the senior on the right, the second on the left, the third on the right centre (or centre, if there be but three troops), and the fourth on the left centre.

856. Q. How are the troops designated? A. In whatever direction the squadron faces, the troops are designated numerically from right to left in line and line of columns, and from head to rear in column, *first troop*, *second troop*, and so on. When a new formation necessitates a change of numbers, the change takes effect upon the completion of the movement. In designating their troops, the captains use the letter designation; as, Troop "D," etc.

857. Q. What is the rule for captains when dressing their troops? A. They place themselves on the line, on the flank toward which they dress, facing to the front.

858. Q. Besides forming on the centre troop, what other ways can a squadron be formed? A. It can be formed in line on the right or left troop; it may also be assembled in columns of fours.

859. Q. What is the command of the major to dismiss the squadron? A. Dismiss your troops.

860. Q. Marching in line with the guide right, who is the guide of the squadron? A. The centre guide of the right troop.

861. Q. Marching in line, give the commands of the major to face

the squadron to the rear, and to march it to the rear. A. 1. Fours right (or left) about ; 2. March ; 3. Squadron ; 4. Halt, or, 3. Guide centre.

862. Q. After halting, should the major wish to rectify the alignment, what does he command? A. Captains, rectify the alignment.

863. Q. Being in line at a halt, give the commands and explain, To break from the right to march to the left in columns of fours. A. 1. Column of fours ; 2. Break from the right to march to the left ; 3. March. At the second command the captain of the right troop commands : 1. Right forward ; 2. Fours right. At the command *march* the right troop breaks into column of fours to the front ; when the leading four has advanced thirty yards, the captain commands : 1. Column left ; 2. March ; the guide directs his march parallel to the front of the squadron. Each of the other troops executes the movements explained for the right troop in time to follow nine yards in rear of the one preceding.

864. Q. If marching and the movement is to terminate at a halt, at what time do the guides of the base troop move out? A. They hasten to the point of rest at the preparatory command, and are established at the command *march*.

865. Q. In formations into line by two movements, what guides are established? A. Only those of the rear troops are posted.

866. Q. How do all formations faced to the rear terminate? A. At the halt.

867. Q. Are there any other formations that terminate at the halt? A. Yes, to form on right or left into line.

868. Q. A part of a column of fours having changed direction to the right, give commands and explain, To form line to the left by two movements. A. 1. Fours left ; 2. Rear troops left front into line ; 3. March. The troops that have changed direction wheel by fours to the left ; each captain halts his troop as the fours unite in line. The rear troops execute *left front into line*, the leading fours advancing only so far as to be in line with the troops that have wheeled into line. If it is intended to advance without halting the commands would be : 1. Fours left ; 2. Rear troops left front into line ; 3. Trot (or gallop) ; 4. March ; 5. Guide centre. The captains of the rear troops repeat the command *trot*, and *left front into line* in time to command *march* when their leading fours arrive abreast of the line already formed.

869. Q. Give post of a captain in column of troops. A. On the side of the guide, six yards to the front and six yards to the right or left of his troop. If the guide be centre, he takes post on the same flank as the major.

870. Q. What is the distance between troops in column at full distance? A. Troop front and five yards.



871. Q. Being in column of troops, give commands to form *front into line*. A. 1. Right (or left) front into line ; 2. March ; or, 1. Right (or left) front into line ; 2. Troops ; 3. Right (or left) half-turn ; 4. March.

872. Q. Being in line, give commands to *change front faced to the rear on first troop*, and explain the movement. A. 1. Change front on first troop, faced to the rear ; 2. Troops ; 3. Right half-turn ; 4. March. At the third command the captain of the first troop commands : Right turn. At the command march, this troop executes right turn, is marched just beyond the line, wheeled about by fours and halted. The other troops execute right half-turn, each captain giving the command guide right upon the completion of the half-turn ; when the right guide is opposite his place in line, each captain gives the command : 1. Right half-turn ; 2. March, and the movement is completed as for the first troop.

873. Q. In this movement, how should the fours be wheeled about and the troops dressed ? A. To the right about and dressed to the left.

874. Q. Being in line, give commands to *advance in Line of Columns of Fours*. A. 1. Troops ; 2. Right (or left) forward ; 3. Fours right (or left) ; 4. March ; 5. Guide (right, left or centre).

875. Q. Give the posts of the captains in the foregoing movement. A. On the side of their chiefs of platoons, six yards in front of their leading fours and six yards from the flank of the column.

876. Q. Give the full and closed intervals in *Line of Troops in Columns of Fours*. A. Full interval is troop front and four yards ; closed, eleven yards.

877. Q. Marching in column of fours, give commands to form *front into line of Troops in Columns of Fours*. A. 1. Right (or left) front into line ; 2. Troops in columns of fours ; 3. March.

878. Q. Being in line of Troops in Columns of Four at close interval, give commands to *form Column of Fours*. A. 1. Column of fours ; 2. First (or fourth troop) ; 3. Forward ; 4. March.

879. Q. What is the distance between troops in Close Column ? also, give posts of the captains and major in close column. A. Twelve yards ; captains on the side of the guide six yards in front and six yards to the right or left of the flank ; if the guide is centre they are on the same flank as the major ; the major is twenty yards from the flank on the side of the guide.

880. Q. Being in column of troops at a halt, give commands to *form close column* (the troops being at full distance). A. 1. Close in mass ; 2. Guide right (left or centre) ; 3. March.

881. Q. In this movement, give the commands of the captains. A. The captain of the first troop, at the second command, cautions it to stand fast ; the other captains commands : 1. Forward ; 2. Guide right.

882. Q. Being in close column at a halt, give commands to *take full distance*. A. 1. Take full distance; 2. Guide right (left or centre); 3. March.

883. Q. Being in line at a halt, *ploy into Close Column* and explain. A. 1. Close column on first (or fourth) troop; 2. Fours right (or left); 3. March. At the first command the captain of the first troop commands: 1. Forward; 2. Guide left. At the command march, the first troop advances eighteen yards, is halted and dressed to the left; the other troops execute fours right. The captain of the second troop halts in rear of the left of the first, and as his rear four passes him, commands: 1. Fours left; 2. March; 3. Troop; 4. Halt; 5. Left; 6. Dress; 7. Front. The other troops incline to the right, and each moves by the shortest line so as to enter the column and form line to the left, halts and dresses to the left, twelve yards in rear of and parallel to the preceding troop.

884. Q. Being in close column, give the commands *to change direction by the flank*. A. 1. Change direction by the right (or left) flank; 2. Fours right (or left); 3. March.

885. Q. In this movement, give command of the captain of the first troop, and when is it given? A. 1. Right forward; 2. Fours right. Given at the second command of the major.

886. Q. Being in close column at a halt, *deploy the column*. A. The commands are: 1. Deploy column; 2. Fours left (or right); 3. March. At the second command the captain of the first troop cautions: Stand fast. At the command march, the first troop is dressed to the right; the other troops execute fours left; each captain halts when eight yards beyond the left of the preceding troop and as the rear of his troop passes him commands: 1. Fours right; 2. March; 3. Guide right; halts the troop near the line, and dresses it to the right.

887. Q. The squadron being in Column of Platoons explain—giving commands—to form *on right into line* (the squadron being in march). A. 1. On right into line; 2. March. At the command march, the first troop executes on right into line; the other troops march beyond the first, each captain commanding: 1. On right into line, 2. March, when his leading platoon is six yards beyond the left flank of the preceding troop. Each chief of platoon halts his platoon when near the line and commands: 1. Right; 2. Dress. The captains give the command: 1. Front.

888. Q. In this movement where is the guidon posted? A. At the point of rest, thirty yards to the right of the head of the column.

889. Q. How and where are the guides posted in *successive formations* terminating at a halt? A. By the adjutant or sergeant-major, or both, as may be directed by the major. The guidon is posted at the point of rest, and the principal guide of the opposite flank takes position a little more than troop front from

him, both facing to the front. If marching they hasten toward the point of rest at the preparatory command, and are established at the command march. In formations into line by two movements the guides of the rear troops are posted on a line with those troops wheeled into line. In deployment the guides are posted on the line of the leading troop. In forming front into line, they are established thirty yards in front of the head of the column. On right (or left) into line, thirty yards to the right or left of the column. In changes of front, the guidon is posted thirty yards from the right or left of the designated troop, according as the change of front is to the right or left. In forming line facing to the rear, the guides of each troop are so posted as to permit the troops to pass between them, the one then farthest from the point of rest closes to a little greater than troop front. The guides should be taught to post themselves without aid.

890. Q. What is the interval (close) between troops in Line of Platoon Columns? A. Twelve yards.

891. Q. Give the positions of the captains in line of platoon columns. A. Six yards in front of their guidons.

892. Q. In the movement, *To form line of Platoon Columns to the right or left*, when does the captain of the leading troop halt it? A. When its rear has cleared the column by twelve yards.

893. Q. Being in column of platoons at a halt, give the commands of the major to form *front into line of Platoon Columns*. A. 1. Right (or left) front into line of platoon columns; 2. March.

894. Q. Give the commands of all the captains to carry out the movement. A. At the first command, all the captains command: 1. Forward; 2. Guide left (or right); the captain of the second troop adds: Column right (or left); the captains in rear of the second add: Column half-right (or left). At the command march, the first troop having advanced thirty yards, the captain commands: 1. Troop; 2. Halt; 3. Left (or right); 4. Dress.

895. Q. Being in line of platoon columns, at the halt, give the command of the major to *Change Front on First Troop*. A. 1. Change front on first troop; 2. March.

896. Q. What are the commands of the captains? A. At the first command the captain of the first troop commands: 1. Forward; 2. Guide right; 3. Column right; the other captains command: 1. Forward; 2. Guide right; 3. Column half-right.

897. Q. When is the first troop halted? A. When the pivot trooper of its rear platoon has advanced twelve yards in the new direction.

898. Q. Being in line, give the commands of the major to form *Double Column of Fours*. A. 1. Double column of fours; 2. Centre forward; 3. March; 4. Guide right (or left).

899. Q. In the "Order in Echelon," what is the distance between troops? A. Troop front and five yards.

900. Q. Being in line, give the commands of the major to *form echelon* with the right troop as the *base*. A. 1. Form echelon ; 2. First the base troop ; 3. March.

901. Q. In charging by squadron, where does the major take post ? A. In the line of captains.

902. Q. Describe charging the enemy by subdivisions. A. The subdivisions charge successively, each at such distance from the one preceding as to support it promptly or to enable it, if repulsed, to clear the flanks of the column and reform in its rear. The successive subdivisions continue the attack, break through the enemy's line, rally in his rear, and charge again as they return.

903. Q. In the instructions of the squadron (acting alone) in the charge, how is it formed ? A. In two or three lines.

904. Q. Who are the leaders of the lines ? A. The senior officer with each.

905. Q. How many troops in the attacking line ? A. One, two, or three troops.

906. Q. The major having designated the three lines, and the squadron having arrived at the position for taking the formation, what does he command ? A. 1. Form for attack ; 2. March.

907. Q. At the foregoing command, what does each captain do in regard to arms ? (In the attacking line,) A. They cause their troops to draw sabre, or raise pistol if that arm has been designated by the major.

908. Q. And the captains of the support and reserve ? A. They cause their troops to draw sabre.

909. Q. The attacking line taking the trot, what becomes of the support and reserve ? A. They move toward their positions on the flanks, and each takes the trot when the attacking line has gained the proper distance.

910. Q. What are the proper distances ? A. The support should have about eighty yards from the attacking line ; the reserve at a distance not greater than one hundred and fifty yards from the support, unless otherwise ordered.

911. Q. What is the next command of the major, and when given ? A. 1. To the charge ; 2. March, when the attacking line has arrived at the proper place to begin the rapid advance.

#### EXTENDED ORDER.

#### GENERAL PRINCIPLES.

912. Q. What is the basis of extended order ? A. The squad.

913. Q. How should men be taught to regard the squad ? A. As the unit from which they ought never to be separated ; but if the squad should be broken up or the men separated, they place themselves under the orders of the nearest squad-leader,

and remain with his squad as if it were the one to which they originally belonged.

914. Q. In this connection, what should officers and non-commissioned officers give their attention to? A. To preserving the integrity of the squads; they appoint new leaders to replace those disabled, organize new squads when necessary, and see that every man is placed in a squad.

915. Q. From what formations may extended order be taken? A. From any.

916. Q. Upon halting upon the line, what position do men take with their arms? A. Advance carbine. If the pistol is to be used, that arm will be designated before deploying, and the men take the position of raise or lower pistol.

#### LEADING THE SQUAD.

917. Q. In the exercise in leading, how should the commands, as a rule, be given by the corporal? A. By signals; as far as possible without commands or cautions.

918. Q. Give the position of the corporal. A. He is posted two yards in front of the squad.

919. Q. Who is the guide of the squad? A. The man in front of whom the corporal places himself.

920. Q. Supposing the corporal does not wish the squad to follow him, what does he do? A. He commands: Guide (right, left, or centre), and indicates the point of direction; if marching by the flank he indicates the direction.

921. Q. In marching to the rear, where does the corporal take post? A. In front of the squad.

#### THE SQUAD.

922. Q. When is the squad deployed forward, and which is the habitual gait of the deployment forward? A. When it is in rear of the line to be occupied. The gallop.

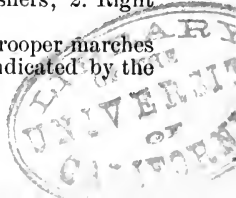
923. Q. In the deployment by the flank, which is the habitual gait? A. The trot.

924. Q. Give the normal interval between skirmishers. A. Four yards.

925. Q. Give the post of the corporal before giving the commands for marching; also upon halting. A. He places himself two yards in front of the trooper that is to be the base or guide. Upon halting he places himself two yards in rear of his squad.

926. Q. The squad being in line, give the commands to *deploy forward on the left skirmisher*. A. 1. As skirmishers; 2. Right front into line; 3. March.

927. Q. Explain the movement. A. The left trooper marches at the trot straight forward, or in the direction indicated by the



corporal; the other troopers oblique to the right at the gallop, each taking the direction and gait of the left trooper when at his interval from the trooper on his left and when on the alignment. The troopers on the right increase the angle of obliquity to more than forty-five degrees. The squad having arrived on the line to be occupied, the corporal commands: 1. Squad; 2. Halt.

928. Q. Give the commands, and explain, to *deploy forward on centre trooper*. A. 1. As skirmishers; 2. Right and left front into line; 3. March. The centre skirmisher trots straight to the front; the other skirmishers oblique to the right and left at a gallop.

929. Q. Being in line, explain, to *deploy by the right flank*. A. The fours wheel to the right and move at the trot; No. 4 of the left four moves directly to the position he would occupy if, upon completion of the wheel, he had turned to the left and halted; No. 3 of that four turns to the left and halts so as to be abreast of and four yards to the right of No. 4; then No. 2 and then No. 1, then No. 4 of the now rear four, and so on from the rear of the column, each trooper in succession turning to the left and halting so as to be abreast of and four yards from the next trooper on his left.

930. Q. Marching in column of fours, give commands, and explain, to *deploy by a flank*. A. As skirmishers; 2. To the left (or right); 3. March. The skirmishers deploy as when deploying by a flank. (See answer to preceding question.)

931. Q. To make the original deployment—say to the front—at a greater or less interval than four yards, what would be the commands of the corporal? A. 1. As skirmishers, at (so many) yards; 2. Right (or left) front into line; 3. March.

932. Q. Being deployed as skirmishers, what would be the commands? A. 1. To (so many) yards extend (or close); 2. March.

933. Q. Being deployed in line, give commands and explain, to *change front or direction to the left*. A. 1. Squad left; 2. March; or 1. Left turn; 2. March; or 1. Left half-turn; 2. March. Executed on the same principles as when in close order; the skirmishers move directly to their places and take intervals on the new line from the pivot. The first two or three troopers are established by the corporal on the new line as the base of the new front.

934. Q. What is the *rally* used for? A. For immediate and concentrated action when there is not time to form in the normal order.

935. Q. Explain the *rally*. A. The corporal signals or commands, Rally. The troopers return carbine, move at a gallop, and form quickly, faced to the front, in rear of the corporal, without reference to their previous order in the rank, and draw sabre.

936. Q. Being deployed or rallied, what are the commands of the corporal to *assemble*? A. 1. Assemble; 2. March.

937. Q. Explain the movement. A. The men move toward the corporal and form in their proper places; if deployed they close toward the corporal at the trot.

938. Q. Give any other ways that you know of to assemble the squad. A. The corporal may direct the squad to assemble in column of fours; or, he may cause the assembly or rally to be executed on the march. In this case the corporal and base troopers march forward; the other troopers gain their positions by obliquing and increasing the gait.

939. Q. What is the rule for carbine firing by mounted skirmishers? A. It is confined to temporary resistance by small scouting parties; by the advance patrol of the advance guard; under circumstances which forbid the mounted charge it may be used to accelerate the retreat of the enemy's rear guard; and during a retreat, for checking the enemy, by compelling him to advance more cautiously.

940. Q. Supposing a halted skirmisher exposed to fire without cover, what must he do except when firing? A. He must keep in motion by describing a figure 8 around his post as a centre.

941. Q. Being deployed, at the signal or command *Charge*, what does each skirmisher do? A. He returns pistol or carbine, and draws sabre.

942. Q. How does the line charge? A. As foragers.

943. Q. Being deployed as skirmishers, give the commands and explain, *To dismount and mount on the skirmish line*. A. 1. Squad; 2. Dismount. Each skirmisher quickly dismounts in place, detaches his lariat, seizes the loose end of it, and runs forward its full length, or to such a point short of that distance, as may afford advantageous shelter. To mount: 1. Squad; 2. Mount. The skirmishers sling carbine, go quietly to their horses, coiling the lariat on the way, secure the lariat to the saddle, and mount.

944. Q. Before dismounting to fight on foot, what is the general rule for the formation of the squad? A. It is formed in column of fours.

945. Q. In the drill *to fight on foot*, who is the horse-holder? A. No. 4. No. 2 or No. 3 may be when so directed by the corporal, which must always be done before giving the command, *To fight on foot*; he keeps the horses of the dismounted troopers on his right and left, and the reins of the two next to his right and left are held in his right hand.

946. Q. In a defensive position, how may all the horses of the squad be linked and cared for? A. Together in a circle, and left to the care of one horse-holder, who dismounts; or, this horse-holder may hold the horses of numbers 4 by the reins.

947. Q. Being in column of fours, give the commands *to dis-*

*mount to fight on foot*—to the front. A. 1. To fight on foot; 2. Action left (or right) front.

948. Q. Explain fully all that is done at the first command. A. Nos. 1 and 2 oblique to the right; Nos. 3 and 4 to the left; and all halt; the troopers only oblique far enough to allow room to dismount without interfering with one another; Nos. 1, 2, and 3 dismount; No. 3 passes his reins over his horse's head, faces about, gives them to No. 4, who holds them at such length that he can best control the horses; No. 4 now moves his horse's shoulders to the right to straighten him in the column; No. 2 disengages the link-strap, faces towards the rear, seizes the halter-ring of No. 3's horse with the right hand, pulls his horse's head inward, and with the left hand, back up, engages the snap in the halter-ring; No. 1 executes the same with No. 2's horse; the reins of Nos. 1 and 2 should be placed behind the pommel.

949. Q. Explain what is done at the second command. A. The dismounted troopers of each four unsling carbine and form, facing to the front, in their normal order, one yard to the front of their horses' heads, and one yard to the left of the column, the rear fours, at double time, execute left front into line on the leading four; if sets in rear arrive in line before others that precede them in column, they must leave room to form line in normal order.

950. Q. Give commands, and explain, *to fight on foot to the right*. A. 1. To fight on foot; 2. Action right. Nos. 1, 2, and 3 dismount and link; then unsling carbine and form five yards to the right of their horses, facing to the right.

951. Q. Being in column of twos, what is done at the command *to fight on foot*? A. Nos. 1 and 2 dismount without closing distance; Nos. 3 and 4 oblique quickly to the left and form four; No. 3 dismounts and the horses are linked; the horses are then closed.

952. Q. In this drill (to fight on foot) what may be done in emergencies? A. One half the squad may be dismounted by the commands: Nos. 1 and 3 (or Nos. 2 and 4); 2. Dismount; 3. Action right (or left).

953. Q. Being dismounted to fight on foot, explain the different methods of *To mount*. A. The corporal causes the squad to assemble, marches it to the vicinity of the led horses, or he may cause the led horses to be advanced to meet the troopers; he then commands: Stand to horse; or, 1. Squad; 2. Mount. In the first instance the troopers sling carbine, unlink and take the position of stand to horse; the squad may then be mounted. In the second, the troopers sling carbine, unlink and mount.

954. Q. What is the interval between troopers dismounted *to fight on foot*? A. Except otherwise directed, two yards.

955. Q. If it is desired for the squad to *kneel* or *lie down* upon being deployed, when is the command given, when executed, and what becomes of the instructor? A. The corporal designates the



position before deploying; it is executed at each halt, and the corporal, as instructor, remains standing.

956. Q. Give the first, third, and fifth general rules of fire discipline. A. 1st. Never load until the moment of firing; 3d. Never fire after the command or signal cease firing; 5th. Never fail to adjust the sight at the range named.

957. Q. What are the exceptions to the foregoing rules? A. It is allowable, especially for scouts, vedettes, or patrols, to fire when necessary to give the alarm, in self-defense, and when a good opportunity occurs to fire upon a leader of the enemy.

958. Q. What rules should be observed by men armed with the carbine, when acting beyond the immediate control of leaders, not to fire? A. Never fire at a distance over 400 yards at a man lying down; 500 yards at a man kneeling; 600 yards at a man standing; 700 yards at a horseman; 800 yards at a small squad of men, or thin line of skirmishers.

959. Q. How about *volley firing*? A. Can be fired by squads at troops in close order at distances not exceeding 600 yards at a line equal to the front of four men; 800 yards at a line equal to the front of a squad of twelve men; 900 yards at a line equal to the front of a platoon; 1000 yards at a line equal to the front of a troop.

960. Q. Give the commands *to fire at will*. A. 1. Fire at will; or, 1. Fire at will kneeling (or lying down); 2. At (such an object); 3. At (so many) yards; 4. Commence firing.

961. Q. Give the commands to fire as skirmishers with counted cartridges. A. 1. Fire one (two or three) round; 2. At (such an object); 3. At (so many) yards; 4. Commence firing.

962. Q. Give explanation of the *rapid fire*. A. In this fire the number of cartridges is not limited; the objective is not indicated; when used before making the assault, the instructor orders the sights laid down, and then commands: 1. Rapid fire; 2. Commence firing.

#### THE TROOP.

963. Q. Give the post of officers. A. The captain is the instructor, and takes post between the attacking line and support. One lieutenant commands the attacking line; the other commands the reserve, or if there be no reserve he commands the support.

964. Q. Which lieutenant commands the attacking line, and where does he take post? A. It is commanded by the one whose platoon is on the line; he takes post about thirty yards in rear of the line.

965. Q. In action where does the commander of the support take position? A. One from which he can observe the progress of the action, and, if possible, watch the scouts or patrols, keeping a good lookout for the commands and signals of the captain.

966. Q. Which flank of a troop should an attacking line be taken from when the troop is in line; and which platoons are designated when the troop is in column? A. As a rule, from the left when in line, and the leading platoons when in column.

967. Q. Give the duties of squad-leaders in movements by squads in the troop drill. A. He gives the commands necessary for the movements of his squad and leads it into position. In deploying as skirmishers by the flank, he supervises the deployment from opposite the rear of his squad and then takes his place in the line of skirmishers; in forming line of platoons and deploying as skirmishers to the front he takes or keeps his place in rank—retaining, however, supervision of his squad.

968. Q. What is the normal interval between squads in line of squads? A. Forty-eight yards.

969. Q. The troop marching in line, give commands for forming *line of squads to the front on an interior squad*, and explain the movement. A. 1. Line of squads; 2. On (such) squad, (such) platoon; 3. Fours right and left; 4. March. At the command march, the leader of the designated squad marches it to the front; the squads to the right to execute fours right, column half-left, and those to the left fours left, column half-right; each is marched in line to the front, when it has attained its interval from the squad next toward the base squad.

970. Q. Where are the posts of chiefs of platoons in line of squads? A. Ten yards in rear of the centre of their platoons.

971. Q. Line of squads being halted, where do the leaders of squads take post? A. Two yards in rear of their squads.

972. Q. Being in column of fours give commands to form *line of squads to the front*. A. 1. Right (or left) front into line of squads; 2. March; 3. Troop; 4. Halt.

973. Q. Give commands and explain, to form *line of squads to the right from column of fours*. A. 1. Line of squads; 2. To the right; 3. March. At the second command the squad leader of the rear squad commands Fours right. At the command march, the rear squad forms line to the right, advances six yards and is halted; the other squads continue the march, and each in succession from the rear of the column, when it has its interval, is formed into line to the right and is halted on the line of the base squad.

974. Q. Give the commands for deploying a *line of squads as skirmishers to the right or left front*; also to a flank. A. 1. As skirmishers; 2. Right (or left) front into line; 3. March. As skirmishers; 2. Fours right (or left); 3. March.

975. Q. The troop being in column of fours, can it be deployed as skirmishers? A. Yes, the same as prescribed for the squad.

976. Q. Being in line of squads or deployed as skirmishers, assemble the troop and describe the movement. A. The captain takes post, or sends the guidon, where he wishes to form the

troop, and commands : 1. Assemble; 2. March. The skirmishers or squads move promptly toward him and reform in their normal order; also the support and reserve.

977. Q. Explain the *rally*. A. The captain goes quickly, or sends the guidon, to the squad or place selected as the rallying-point and signals or commands : Rally. It is executed by the attacking line as explained for the squad. The support forms on the line, or acts under special instructions. As soon as practicable after rallying, the troop is assembled again or deployed. The captain may command : Rally by platoons; or, Rally by squads.

978. Q. Being in line of squads, give commands and explain, *To march to the rear*. A. 1. To the rear; 2. March; 3. Guide centre (right or left). Each squad-leader wheels his squad left about by fours. The captain designates the point of direction to the base-squad.

979. Q. How is the firing line relieved? A. The captain notifies the commander of the firing line and support. The commander of the firing line notifies his group-leaders. The support is deployed or extended so as to complete the movement in rear of the firing line, and is advanced to the position to be occupied, either in advance or in rear of the old line; the latter is then marched to the rear and assembled, and becomes the support.

#### THE SQUADRON.

980. Q. How is the squadron in extended order formed, whether operating alone or in regiment? A. In three echelons, viz.: The attacking (or firing) line, the troop support, and the reserve.

981. Q. What does the attacking line consist of? A. One, two, or three troops.

982. Q. Who designates them? A. The major; he also designates the reserve, and, if necessary, the size of the troop supports.

983. Q. Being in line, give the commands of the major to form *line of squads*. A. 1. Line of squads; 2. On (such) squad, (such) troop; 3. March.

984. Q. Explain the movement. A. At the second command, the officers and non-commissioned officers take their posts, and, when necessary, the support of the base-troop and the reserve are halted or moved a little to the rear, so as not to interfere with the deployment. At the command march, the base troop forms line of squads; the troops to the right are marched in columns of fours to the right, and each when the rear of its column is opposite to the left of its position, forms line of squads to the left; in a similar manner the troops to the left are moved to the left and form line of squads to the right. The troops other than the base may march diagonally to position. Before reaching

position for deployment, the captains may detach their supports, which then march to their positions without interfering with the other troops.

985. Q. *To halt the squadron.* A. The major commands : 1. Squadron ; 2. Halt ; or he may designate the line to be occupied ; the captain of the base-troop halts it on arriving at that line.

986. Q. How is line of squads formed from column of troops ? A. By the same commands ; the first troop forms line of squads on its left or right squad, according as the formation is to be to the right or left front ; the other troops of the attacking line are marched opposite the left or right of their positions, and then form line of squads.

987. Q. The squadron being in column of fours, how is the line of squads formed to the right or left ? A. By the commands and means explained for the troop. Each captain forms his troop in line of squads when opposite its position in line.

988. Q. Being in line, give the commands of the major *to deploy as skirmishers*, and explain the movement. A. 1. As skirmishers ; 2. On (such) squad, (such troop) ; 3. March. The base-troop deploys at once ; the troops to the right gain their intervals to the right and deploy ; those to the left gain their intervals to the left and deploy. If marching, the deployment is made gaining ground to the front.

989. Q. Being in line of squads or as skirmishers, give the major's commands *to increase* or *diminish intervals*. A. 1. On (such) squad, (such) troop, to (so many) yards extend (or close) ; 2. March.

990. Q. Explain the movement. A. The squads open from or close toward the base-squad. If marching, the squads are marched obliquely at an increased gait ; if at a halt, they are marched by the flank. Skirmishers open from or close toward the base-trooper. If marching, the movement is executed by obliquing and increasing the gait ; if at a halt, the movement is executed by the flank, the base-trooper moving six yards to the front.

991. Q. Explain the *assembly*. A. The major causes the recall to be sounded. The captains assemble or rally their troops. The major causes the adjutant's call to be sounded, or commands : 1. On (such) troop ; 2. Assemble ; 3. March ; the troops, including the reserve, are marched to the point occupied by the major, or to the designated troop ; the squadron is formed in its normal order in such formation as the major may direct.

992. Q. To assemble at the trot or gallop. A. The trot or gallop is sounded immediately after the adjutant's call.

993. Q. To fight on foot when the squadron is acting alone, what is the rule for the reserve ? A. It remains mounted, and guards or furnishes the guard for the led horses.

994. Q. How is it when the squadron is with the regiment ?

A. The squadron reserve is dismounted, but the major may designate a mounted escort for the led horses.

995. Q. Being in columns of fours, give the commands of the major, *To fight on foot*. A. 1. Troops; 2. To fight on foot; 3. Action right (or left); or, 3. Action right (or left) front.

996. Q. After dismounting, how do the captains assemble their troops? A. The squad falls in, and each captain assembles his troop on what was his leading squad before dismounting.

997. Q. Give another way of forming the column of fours to fight on foot. A. Form the column front into line of troops in columns of fours, and then dismount to fight on foot.

998. Q. State an object for this movement. A. Each troop on arriving on the line could, at once, be dismounted to fight on foot.

999. Q. Being in line of platoon columns, what would first have to be done before dismounting to fight on foot? A. The major would have to break the line of platoon columns into troops in columns of fours to the front, and then dismount them.

1000. Q. How may the double column of fours be dismounted to fight on foot? A. It is dismounted to fight on foot to the right and left, so as to form on its outer flanks.

1001. Q. Explain the assembly of the dismounted squadron. A. Adjutant's call is sounded, or the major commands: 1. On (such) troop; 2. Assemble; 3. March. The designated troop stands fast or takes such position as the major may direct; the other troops are closed toward the designated troop, and form on it with intervals of two yards between troops.

1002. Q. Explain *To remount the squadron*. A. The major causes the recall to be sounded, at which each captain rallies or assembles his troop, marches it to the led horses, and mounts it. The squadron is then assembled.

1003. Q. What other way may the dismounted squadron be assembled? A. The major may cause the led horses to be conducted to the dismounted line, the captains assemble their troops and mount them, or mount them deployed, according as the recall or prepare to mount is sounded. The squadron may then be assembled.

#### THE DISMOUNTED SQUADRON IN ACTION.

1004. Q. What are some of the duties of the major in "The dismounted squadron in action"? A. He regulates the progress of the action, sees that the firing line advances upon the indicated objective, hastens or delays the reinforcement by the support, and disposes the reserve so as to guard against surprise.

1005. Q. To whom does he leave the execution of the details? A. To his subordinates; but he exercises a general and ac-

tive control in such manner as to increase the energy of the action up to the decisive moment.

1006. Q. What is the duty of each captain in the fighting line? A. He regulates the march of the line within the limits assigned to him, keeps in communication with his support, and brings it upon the firing line pursuant to orders, or without orders when necessary; he directs the fire and regulates its intensity.

#### THE FRONT OF ACTION.

1007. Q. Where does the field of action extend? and explain where the action of the squadron should be concentrated. A. The field of action extends forward to the enemy's troops and to the right and left as far as the middle of the intervals between it and the adjacent squadrons, with which it should keep touch and act in concert. In this space the action of the squadron should be concentrated.

1008. Q. When and how may the enemy be outflanked and be attacked both in front and flank? A. When the relative strength of the command warrants it, provided such attacks can be made simultaneously.

1009. Q. Before forming for attack or defense, what precautionary measures should be taken? A. Ground scouts and combat patrols are sent forward and on the flanks, under specific instructions; they remain mounted, as far as practicable, and convey information acquired by signals previously agreed upon.

1010. Q. When the action commences, what becomes of the ground scouts and combat patrols? A. The former are drawn in; the latter remain upon the flanks.

#### THE OFFENSIVE.

##### SQUADRON IN REGIMENT.

1011. Q. How should the squadron be formed on first coming within the zone of artillery fire? A. In line or in line of columns.

1012. Q. What does it then do? A. It advances until the artillery fire becomes effective (about 3000 to 2500 yards from the enemy on open ground). The squadron, under cover if possible, is then dismounted to fight on foot and assembled.

1013. Q. What should be the fighting front, dismounted, on the offensive? A. It should rarely exceed one half the front of the squadron when mounted and in line, and this should include a space of from twenty-four to forty-eight yards between the squadrons.

1014. Q. The squadron being on the offensive, and the precautionary measures taken, when does the major give the commands for advancing? A. When the ground scouts have advanced about one hundred and fifty yards.

1015. Q. When is each support put in march? A. When the firing line has advanced about two hundred yards.

1016. Q. When does the firing line form line of platoons; when line of squads; and when does it deploy as skirmishers? A. At about 1700 yards line of platoons, at about 1200 yards line of squads, and at about 900 yards it deploys as skirmishers.

1017. Q. At what distance may the scouts find it necessary to halt and await the arrival of the firing line? A. At 800 yards or less.

1018. Q. How may the firing line be advanced while under fire? A. From cover to cover by rushes executed by the whole line, if possible, or by alternate troops.

1019. Q. In emergencies, the commander of the support may reinforce without waiting for orders. Explain how it is done. A. The platoons of the support generally reinforce on the flank from which detached and are moved forward rapidly to avoid loss.

1020. Q. In battle, what should the reserve do? A. It should conform to the varying circumstances of the battle, and, without waiting for the orders of the major, gradually draw nearer to the fighting line, so as to be ready to replace the supports when the latter have been absorbed; the reserve troops then take the battle formation.

1021. Q. Supposing the firing line has advanced near enough to the enemy to make alternate rushes necessary, how are the rushes ordered and what are the major's commands? A. The major notifies the captains, who give the necessary instructions while the men are lying down or behind cover. The major then commands: 1. Advance by rushes; 2. Second (or such) troop, fire two (or three) volleys; 3. First (or such) troop forward.

1022. Q. Explain the movement. A. The captain of the second troop gives the commands for the volleys; the captain of the first gives the commands to rush forward. The instant of the first volley the first troop runs forward about fifteen yards, or to cover, if there be any; the captain then commands: 1. Fire by troop; the troop halts, and he then completes the commands for firing.

1023. Q. How if the firing is to be executed by platoons, by squads, or as skirmishers? A. The captain indicates the kind of fire, number of volleys or rounds, and commands: Commence firing; the chiefs of platoons or squad-leaders complete the commands for firing.

1024. Q. What is done by the second troop at the instant of the delivery of the first volley by the first troop? A. The second

troop rushes about fifteen yards in advance of the line of the first troop, or to cover if there be any, when it is halted, and fires the specified number of volleys ; the first troop is then advanced in the same way beyond the second, and so on.

1025. Q. When the time for the assault has arrived, what does the major signal? and explain what is executed. A. The major signals: Cease firing, and commands: 1. To the charge; 2. March. The men rise and advance in double time. Having arrived at about thirty yards from the enemy, the captains command: Charge. The men advance on the enemy at the run. Having driven the enemy from the position, each captain selects ground in his front, or the major assigns a position favorable for firing upon the retreating enemy, or for resisting a counter-attack.

#### THE SQUADRON ACTING ALONE.

1026. Q. What does the advance guard usually do? A. It opens the action and, if possible, compels the enemy to deploy.

1027. Q. What becomes the duty of the major when the enemy is signalled? A. He decides upon the character of the attack and makes the necessary dispositions. He must keep a reserve, husband his strength, and cover his flanks and rear with mounted patrols or scouts.

1028. Q. How is the attack conducted? A. Conformably to the principles prescribed for the squadron in regiment.

1029. Q. While the final assault is being made, what is done with the led horses? A. They should be brought forward.

1030. Q. If the success of the assault is assured, what does the reserve do? A. It is mounted, and at a signal from the major takes up the pursuit. If the occasion seems opportune, the commander of the reserve does not wait for orders.

#### THE DEFENSIVE.

##### SQUADRON IN REGIMENT.

1031. Q. Having conducted his squadron to the position designated, what duties then devolve upon the major? A. He sends out his patrols and ground scouts, who connect with those from adjacent squadrons. He then reconnoitres the position—its approaches and flanks, and means of communications, front and rear; he also selects rallying-points. He designates to each subdivision the position it is to occupy and the defensive works it is to construct—such as abatis, shelter trenches, etc.; also the position of the led horses if they be not assembled with the regiment.

1032. Q. What formation is taken? A. Generally the same as on the offensive.



1033. Q. If the enemy is repulsed, what follows? A. The squadron takes the offensive, remaining dismounted unless ordered by the colonel to mount.

1034. Q. How if the enemy succeed? A. The squadron is withdrawn to, or is rallied at, the rallying-point.

### THE SQUADRON ACTING ALONE.

1035. Q. The squadron being in position in battle formation, what is first done? A. The firing line is established on the position; the supports, reserve, and led horses are placed under cover.

1036. Q. The squadron being in the order of march owing to the distance of the enemy, what is done? A. The advance guard establishes itself on the position and sends out patrols and scouts.

1037. Q. How does the major make his dispositions and reconnoissance? A. The same as when in the regiment.

### EMPLOYMENT OF CAVALRY.

1038. Q. What do the duties of the cavalry division comprise? A. Those pertaining to independent operations of cavalry and of cavalry attached to infantry divisions and corps.

1039. Q. To whom is the commander of the cavalry division responsible? A. To the commander of the army; must have perfect independence, and never wait for orders to attack.

### AGAINST CAVALRY.

1040. Q. What, in offensive operations, must cavalry never wait for? A. To be attacked, but must always take the initiative.

1041. Q. What are the essentials necessary to success? A. Order, uniformity, and the proper employment of reserves; the object being to ride the enemy down and complete his overthrow with the sabre and pistol.

1042. Q. In attacking, what kind of field is best adapted to a charge? A. One slightly undulating is better than a level plain.

1043. Q. What are the most favorable opportunities for attacking cavalry? A. When the enemy is issuing from a defile with a narrow front; when it is possible to surprise him in column formation; when he can be taken in flank while charging another body; when he is in the act of changing formation; and when he is on ground unfavorable for his deployment.

1044. Q. As the attacking line gives the main blow, what should be its size, if possible, with reference to the enemy; also to the command to which it belongs? A. It ought to be stronger and

cover a greater front than the enemy. It should consist of at least half of the entire force.

1045. Q. In what formation should it generally advance to the attack, giving reasons therefor? A. Generally in line of columns, preferably in line of columns of fours at full intervals; in this formation the intervals and general alignment can be preserved or regained with less confusion than in any other, and ground may more easily be gained toward a flank by obliquing by heads of columns.

1046. Q. What gaits should be used against formed cavalry? A. The trot should be continued as long as possible, or until within a few hundred yards, when the gallop should be taken and progressively increased.

1047. Q. In the attack what should be done to infuse vigor and enthusiasm in the command? A. At the signal to charge all the trumpeters should sound and repeat the signal and the troops cheer.

1048. Q. After the signal charge, what should each troop do? A. It should follow its captain as a unit, keeping touch of stirrup, toward the centre.

1049. Q. What comprises the support? how is it posted and manœuvred? its formation, and distance from the reserve. A. It comprises from one fourth to one third of the whole command, and is so posted and manœuvred as to give direct and timely support to, and assure the success of, the attacking line. It is usually formed in line of columns, and at a distance of about two hundred and seventy-five yards from the attacking line. The greater part of the support will be formed in echelon to the attacking line, the inner flank of this part being from fifty to seventy-five yards to the right or left of the right or left flank of the attacking line. The remaining squadron or squadrons of the support will be placed at rather wide intervals in rear, or so placed as to cover the less exposed flank of the attacking line.

#### AGAINST INFANTRY.

1050. Q. What are the most favorable occasions for cavalry action against infantry? A. When the infantry have exhausted their ammunition; when in disordered retreat, or when much shaken by artillery fire.

1051. Q. If choice be permitted, what kind of ground should cavalry charge infantry on, or what part of its line should the charge be directed against? A. Up hill (not steep), or against its right flank.

#### AGAINST ARTILLERY.

1052. Q. What are the most suitable times for attacking artillery? A. When withdrawing from or going into position, the pieces limbered.

1053. Q. What force would be ordinarily sufficient for an assault on one battery? A. A troop or squadron to do effective work among the horses and guns.

1054. Q. How is the attacking force divided? A. Into two or three parts.

1055. Q. Explain how the force should be used. A. The attacking line charges as foragers, the troop or squadron dividing near the centre as they advance. The foragers assault the battery on both flanks, attacking the cannoneers and the battery support. The support advances to secure the battery. The reserve follows and is held in hand to meet any hostile cavalry that may attempt to recover the guns.

1056. Q. If, after overpowering it, it is found that the battery cannot be held, what should be done? A. The guns should be disabled, horses killed, or traces cut.

1057. Q. How would you disable a field gun? A. By opening the breech-block, and then breaking it with a heavy hammer; or load the piece, close the breech without locking it, and fire the piece; or place two or three blank cartridges in the gun, close and lock the breech-block, ram from the muzzle a ball of clay or sod, then unlock the breech-block and fire; or fire a shotted gun with its muzzle against the chase of another. Guns of the Krupp system may be temporarily disabled by carrying off the breech-block or breaking the handle of the breech-block.

#### FORAGERS AND SKIRMISHERS.

1058. Q. How may the charge as foragers be used to advantage? A. Against artillery, infantry in extended order, and shaken or broken forces of any arm.

1059. Q. How are mounted skirmishers principally used? A. To clear or beat up wooded or broken localities, in conveying supply trains, and in partisan or Indian warfare.

#### PURSUIT.

1060. Q. Who should make the immediate pursuit of an enemy that has been routed? A. The troops engaged in the mêlée.

1061. Q. For the more extended pursuit? A. The commander of the Cavalry Division, without waiting for orders from superior authority, should at once send a force to keep in contact with the enemy, and organize and place the remainder of his division to make the pursuit. He should communicate with his superior officers, reporting concisely what has been done, his plans of operation, and the apparent condition and plans of the enemy, requesting orders for his guidance. The cavalry should be accompanied by as many horse batteries as are available.

## DISMOUNTED.

1062. Q. Under what conditions may cavalry be dismounted to fight on foot? A. 1. In an inclosed, wooded, or rough, broken country that cannot be turned, where mounted action is impracticable; e.g., small villages, buildings, hedges, defiles, fords, etc., either offensively or defensively. 2. When an obstacle, such as a bridge or ford, intervenes to prevent the enemy's rapid pursuit and presents an opportunity for delaying or keeping him in check by the use of a few dismounted men. 3. To occupy distant and important points, and hold them against the enemy until the arrival of the infantry. 4. To occupy positions held by infantry, to permit the withdrawal of the latter, thus misleading the enemy to suppose them to be still occupied in force. 5. During a retreat, to offer resistance to compel the enemy to deploy, thus gaining time.

## RAIDS.

1063. Q. What are raids? what should they be composed of, and what are their object? A. Raids are isolated, independent cavalry operations, conducted with secrecy, by rapid marches, usually avoiding general engagements. The force should be composed of the best mounted and most self-reliant troops, and should consist of complete organizations; as regiments, squadrons, etc. Their objects are: To harass and weaken the enemy by drawing off in pursuit his cavalry or other troops, or by causing him to guard a great number of points; to threaten, interrupt, and destroy his communications; to destroy his depots and source of supplies.

## ESCORTS.

1064. Q. How far should escorts to persons, mails, etc., travel per day, and how should details be made? A. For any considerable distance, not more than twenty-five miles. If possible, details should be made from one troop at a time.

1065. Q. Who regulates the time and distance of the marches and the location of the camps? A. The commander of the escort, if a commissioned officer.

1066. Q. What kind of an escort should trains be furnished with? A. Dismounted men; mounted men are posted as flankers and patrols.

## ESCORTS OF CONVOYS.

1067. Q. The commander of the escort being responsible for the convoy, what are his duties? A. He directs the march, keeping as many wagons abreast as practicable; enforces train discipline, placing for this purpose a small part of the escort with the con-

voy, and, with the main body, protects the convoy and expedites the march.

1068. Q. What does the main body furnish? A. Advance-guard, rear-guard, and flankers; reconnoitering patrols are detached to considerable distances.

1069. Q. What is done in case of an attack? A. The escort should, if possible, hold the enemy at a distance, keeping up the march of the convoy; when this is not practicable, the train should be parked and the defense concentrated; if the defense cannot be made successful, such part of the convoy as cannot escape by flight must be destroyed; the animals must be taken away or shot.

#### SCREENING AND RECONNOITERING.

1070. Q. How should the main body of the force for this purpose be held? A. Concentrated, pushing out contact squadrons and patrols well to the front and flanks.

1071. Q. What front should a division of cavalry cover performing this duty? A. About ten miles, varying according to circumstances.

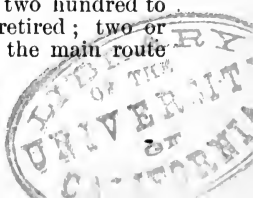
#### ADVANCE AND REAR GUARDS.

1072. Q. What is an advance-guard? A. A body of troops thrown out in front of a marching column, to cover its movements, to prevent surprise, and to gain information.

1073. Q. What are some of its duties in an advance, and in a retreat? A. In an advance it seizes advantageous positions and holds them until the column comes up, or holds in check the advancing enemy until the column can deploy and take up a position to meet him. In retreat it prepares the way for the main body, guarding and repairing roads, bridges, etc., sweeping away partisans or guerillas. If hostile troops have outmarched the column and are in front of it, the advance-guard performs duties of the same nature as in the advance.

1074. Q. Explain fully how the advance-guard is divided. A. In two nearly equal parts, the vanguard and the reserve. The *vanguard* is subdivided into the *advance party* and the *support*. The advance party furnishes the *leading* and *flanking* groups; The support furnishes its own *flankers*.

1075. Q. Explain how the groups, etc., constituting the advance party are posted. A. A *point*, or leading group, of three or four men under a corporal; a *flanking* group of three or four men on either side of the main route, at from two hundred to three hundred yards distance, and somewhat retired; two or three men of the advance party at intervals on the main route preserve communication with the support.



1076. Q. What follows the advance party? A. The *support*, with *flankers* at about five hundred yards in rear of the point.

1077. Q. Explain about the *reserve*. A. The reserve, one-half of the advance-guard, follows at about five hundred yards in rear of the support; the reserve may throw out flanking groups at about five hundred yards on either or both flanks, and somewhat in advance and in rear of its position.

1078. Q. With which parties are commanders of the vanguard and advance-guard? A. The first is with the support; the latter with the reserve.

1079. Q. At what distance from the reserve is the main column? A. Five hundred yards in rear.

1080. Q. What are *rear-guards*, and what are their duties in a forward movement? A. Rear-guards are corresponding bodies in rear of the column. They protect the rear of the column from raiding parties or detachments, arrest stragglers, prevent pillaging, etc.

1081. Q. What are their duties in a retreat? A. They cover the column, checking the enemy, and delaying him so as to insure the safety of the column.

1082. Q. As a rule what should be the strength of the advance and rear-guards in a forward movement? A. The advance-guard varies from one eighth to one fourth of the whole force; in a very small force, one eighth; in a very large force, one fourth, and, generally, one sixth. The rear-guard is generally one half the strength of the advance-guard.

1083. Q. How would it be in a retreat? A. The strength of the guards would be reversed.

#### OUTPOSTS.

1084. Q. What are the principal duties of outposts? A. 1st. to guard all approaches; 2d. To obtain the earliest information of the enemy's movements; 3d. To obstruct and delay his advance.

1085. Q. What should be the size of the detachment for outpost duty? A. It should not, as a rule, exceed one sixth of the whole force. It depends upon the strength of the main command, the proximity of the enemy, the extent of front to be covered, the character of the country, etc.

1086. Q. What extent (in regard to the main body) should outposts cover, and how disposed? A. They should cover the entire front, extend well beyond the flanks and toward the rear. They are generally disposed as follows: First—A line of vedettes or Cossack posts. Second—A line of small groups called pickets. Third—A line of larger groups called supports. Fourth—A reserve. The latter may be omitted.

1087. Q. What is the distance between posts in the line of vedettes? A. From four to six hundred yards.

1088. Q. What does a vedette-post consist of, and how are the men posted? A. Of two men placed twenty or thirty yards apart, who should be relieved every two hours from the pickets. They remain mounted; one man patrols to the right or left; the other remains on the alert at the post.

1089. Q. What does a Cossack-post consist of? A. A non-commissioned officer and three men, one of whom remains mounted; the others are dismounted, but remain in the immediate vicinity, with their horses saddled and bridled, and properly secured.

1090. Q. Give the posts of the picket, the support and reserve. A. The picket is posted about five hundred yards in rear of the centre of the line of vedettes, for which it furnishes reliefs; the support is posted about one thousand yards in rear of the centre of the line of pickets; and if there be no reserve, about the same distance in advance of the force it is to cover; and the reserve about fifteen hundred yards in rear of the line of supports, and about the same distance in advance of the main body.

#### MARCHES.

1091. Q. What is the habitual route march? A. In column of fours.

1092. Q. How is it when the road is unsuitable for this formation, or when the command is small? A. The column of twos is permissible.

1093. Q. What formation may be used to shorten the column? A. The double column of fours, or regiments or brigades, may be marched in parallel columns.

1094. Q. On starting from camp, what should the gait be, and at what rate? A. The first two miles should be at an easy walk, at a less rate than four miles an hour.

1095. Q. How about the halts, and what should be done at the end of each? A. A halt of ten or fifteen minutes at the end of the first hour, and five minutes at the end of each hour thereafter. At the end of each halt the horses' feet should be examined, saddles replaced if they have moved, and cinchas tightened when necessary.

1096. Q. What is the rule after the first hour in regard to gaits, rate of same, etc.? A. The march should average five miles an hour, alternating the walk and the trot; the walk should be at the rate of four miles, and the trot not less than six and a half miles an hour.

1097. Q. Should the day's march be unusually prolonged, what should be done? A. A halt of one hour should be made, near water, if possible, when about two thirds of the distance has been covered.

1098. Q. If the march should be continued for a long period, what rests should be taken, and what is important to see to at these rests? A. At least one day in seven should be devoted to rest. It is important that the horses and equipments be inspected.

1099. Q. In large commands, how should the order in which troops march be regulated? A. The order of brigades in the division, regiments in brigade, squadrons in regiment, and troops in the squadron should be changed each day; the organization at the head of a unit one day takes the rear next day, and so on.

1100. Q. How should marches be conducted of large commands composed of cavalry, horse artillery and infantry? A. When parallel roads are available, the mounted troops should take separate roads from the foot troops. The roads, if possible, should be left to the artillery and trains. The order of march should state whether the troops or trains have the right of way. The position of the commanding officer should be designated each day, as at the head of a certain brigade, etc.

1101. Q. Where does the provost-guard of a brigade march? A. In rear of the brigade.

1102. Q. By what signals should every duty on the march, or in camp, be performed, and what duties are designated in advance? A. By trumpet-calls under the direction of the commanding officer. Reveille and stables should be designated in advance.

1103. Q. When *the general* sounds, what should be done by one or more officers of each troop? A. They should repair to their troop-grounds and superintend the details of preparation.

1104. Q. In exigencies, how far can cavalry march each day for from three to five days? A. Fifty miles in twenty-four hours.

1105. Q. How long would it take cavalry to make a single march of one hundred miles? A. It could be accomplished in twenty-four to thirty hours.

#### CAMPING.

1106. Q. The squadron being in line, with the usual intervals, describe the method of going into camp. A. The troops are dismounted, and, without forming rank, the men unsaddle and place their arms and equipments in line, ten yards in front of the horses; the blankets are placed over the equipments, moist side folded in. The picket-line of each troop is stretched between posts about six feet high, or is stretched on the ground, the ends being firmly secured; the horses are tied to the picket-line by the halter, at intervals of about one yard. The tents of the men are pitched in line, about fifteen yards in rear of the picket-line, the intervals between troops being left free; the tent of the first sergeant is on the right; the arms and equipments are kept in the tents of the men. The kitchen of each troop is near the



left, in front of the line of tents, the sinks in front of the line of kitchens. The tents of the officers of each troop are about thirty yards in rear of the line of tents, the captain on the right: the officers' kitchens are in rear of their tents. The tent of the commanding officer is in rear of the centre of the line of troop officers; if there be other field officers they are on his right; the adjutant is on the left of the commanding officer; the other staff officers are on the left of the adjutant; the kitchen of the field and staff are in rear of their tents; the tents of the non-commissioned staff are in rear of the staff. The sinks of the officers are in rear of the camp. The positions of the band, guard-tent, canteen, officers' horses, and baggage and forage wagons are prescribed by the commanding officer.

1107. Q. May the squadron be encamped in any other way? A. Yes, in column of troops.

1108. Q. In column, where are the tents of the men and officers placed? A. The tents of the men are in line, in rear of their horses, about half-way between them and the horses of the troop next in rear. The tents of the officers are in line, parallel to and thirty yards from the flank of the column toward which the troops are dressed; the tents of the first sergeants are on the flank next to the officers' tents. The tents of the field, staff, and non-commissioned staff are arranged as prescribed for a squadron, in rear of and parallel to the line of troop officers' tents.

1109. Q. Where are the kitchens placed? A. In line, on the flank opposite the officers.

1110. Q. How is the camp of a regiment arranged? A. On the same principles as the camp of a squadron. The regiment camps by squadrons; the tents of the colonel, lieutenant-colonel, and non-commissioned staff are in line in rear of the tents of the squadron commanders, near the centre of the regiment. It may be in the form of a parallelogram. The three squadrons encamp, each in line, on one of the three sides; the regimental headquarters and headquarters of the camp-guard form the fourth side. The picket-lines are stretched inside the camp.

1111. Q. How should a camp be located? A. The camp should be susceptible of good drainage, and be near fuel, water, and the road. When the horses are subsisted by grazing the camp must be near grass.

#### STABLE DUTY.

1112. Q. Who is responsible for the proper performance of stable duty in a troop? A. The captain.

1113. Q. Give the details for the management of a stable. A. A non-commissioned officer, designated *stable sergeant*, or *corporal*, is detailed in each troop to take immediate general charge

of the forage and stable. He is held responsible for the proper policing and sanitary condition of the stable, picket-line, and ground pertaining to them. Two or more men, called *stable police*, are detailed for the purpose of policing, removing manure, feeding, etc., under the direction of the stable sergeant.

1114. Q. How long should a horse be groomed? A. Not less than twenty minutes, and as much longer as may be necessary.

1115. Q. When the horses are sufficiently groomed, who reports the fact, and what is the reply of the captain or other officer in charge? A. The first sergeant, who is then directed by the captain to dismiss the troop, or he notifies the first sergeant that he wishes to inspect the horses.

1116. Q. Give the commands of the first sergeant in each case. A. In the first case he commands: Cease grooming; Lead in. In the second case he commands: Cease grooming; Stand to heel.

1117. Q. In grooming, how is the currycomb held and used on a horse? A. In the right hand, fingers over back of comb; begin on the near side at the upper part of the neck, thence proceed to the chest, arms, shoulders, back, belly, flank, loins, and croup in the order named. Then go to the off side, taking the currycomb in the left hand, and proceed as before. It is applied gently and is used only to loosen the scurf and matted hair.

1118. Q. In garrison, at what hours should horses be fed? A. In the morning at the first call for reveille. Grain is fed again at evening stables, but not until the hay has been distributed and the stable swept out and the dust thoroughly settled.

1119. Q. Give the daily allowance of grain and hay for a horse; also straw for bedding for a month. A. Twelve pounds of oats, barley, or corn; fourteen pounds of hay. One hundred pounds of straw for bedding.

1120. Q. What is the weight of a bushel of barley? Oats? Corn? A. Forty-eight, forty, and fifty-six pounds.

#### CAVALRY HORSES.

1121. Q. How are horses assigned when received at the regiment? A. According to color, under the direction of the commanding officer.

1122. Q. How are they branded? A. On the near hip with the letter of the troop, the number of the regiment on the same horizontal line; as (give an example).

1123. Q. About what weight can a horse carry and travel twenty-five miles in a day of eight hours, including ordinary resting stops? A. About two hundred and twenty-five pounds.

1124. Q. What can a pack animal carry for the same distance? A. About two hundred and forty pounds.

1125. Q. Give the general directions for shoeing a horse. A. In preparing the horse's feet for the shoe, no cutting whatever with the knife is permitted except when necessary to fit the toe-clip. In removing surplus growth of that part of the foot which is the seat of the shoe, use the cutting pincers and rasp. Opening the heels or making a cut in the angle of the wall at the heel must not be allowed. Flat-footed horses should be treated as the necessity of each case may require. In forging the shoe to fit the foot, be careful that the shoe is fitted to and follows the circumference of the foot clear around to the heel; the heels of the shoe should not be extended back straight and outside of the walls at the heel of the horse's foot, as is frequently done. Care must be used that the shoe is not too small, and the outer surface of the wall then rasped down to make the foot suit the shoe. The hot shoe must never be applied to the horse's foot under any circumstances. Make the upper or foot surface of the shoe perfectly flat, so as to give a level bearing. A shoe with a concave ground surface should be used.

1126. Q. What should be the size of a double stall? A. Not less than nine by nine feet.

1127. Q. Of a single stall? A. Should be at least five by nine feet.

1128. Q. In stable management, give a rule for police, cleanliness, etc., of a stable. A. It should be kept thoroughly policed, free from smells, and, except portions of stalls that horses can reach, should be well lime-washed. There must be no accumulation of manure or foul litter inside, nor near the doors or windows without. The feed-boxes are washed from time to time and kept clean. The ground about the picket line is swept daily, and all dung, etc., carried to the manure-heap.

1129. Q. What is best for earthen floors? A. Clay. Gravel or sandy earth is not suitable.

1130. Q. How much exercise per day is necessary for the good health and condition of a horse? A. At least two hours.

1131. Q. When is it particularly necessary to hand-rub a horse's legs? A. After severe exercise.

1132. Q. In the absence of a veterinary surgeon, who has charge of the sick horses of a troop? A. The stable sergeant, who reports daily to the captain for instructions as to their treatment.

1133. Q. What should be done to prevent contagion? A. An animal that shows any symptoms of glanders must be isolated at once, and confined or tied up in some locality where no other animals can come in contact with him.

1134. Q. What should be done with a glandered horse? A. He should be killed as soon as possible.

1135. Q. What are *cathartics*? A. Agents that cause purgation.

1136. Q. Name some of them. A. Aloes, calomel, epsom salts, common salt, and sulphur; croton, linseed, and castor oils; injections and mashes.

1137. Q. What are *narcotics*? A. Agents that are excitants, but whose action is followed by depression of energy—camphor, henbane, belladonna, opium.

1138. Q. What are *stimulants*? A. Agents that act upon the glands generally: Calomel, oxide of mercury, iodine, and its compounds.

1139. Q. What are *astringents*? A. Agents that cause contraction of muscular fibre: Alum, catechu, oak bark, tannic acid.

1140. Q. Among the medicines externally administered, what are *refrigerants*? and name some. A. Agents that diminish morbid heat of a part: Salt and cold water, solutions of acetate, and subacetate of lead.

1141. Q. What are *vesicants*? A. Agents that produce blisters: Cantharides, tartar emetic, croton oil, hot water.

1142. Q. What are *pyogenics*? A. Agents that induce suppuration of wounds: Liniment and ointment of turpentine, black hellebore.

1143. Q. What are *traumatics*? A. Agents that excite healing in wounds: Aloes, myrrh, collodion, oil of tar, resin, solutions of sulphate of copper and zinc.

#### PACKING.

1144. Q. Describe the most suitable animals for packing. A. Active, short-coupled, short-legged, "blocky" mules, weighing from eight hundred to one thousand pounds, are considered the best for pack animals.

1145. Q. How many packers should there be with fifty packs? A. Twelve.

1146. Q. What does the pack-saddle consist of? A. The *saddle proper*; two *pads*; *crupper*; *corona*; *manta*, or pack-cover; two pieces of canvas, each 84 inches by 22 inches, stitched together on the long edges; *halter* and *strap*; canvas *cincha*, ten inches wide; *sling-rope*, one-half inch best hand-laid manilla whale-line, twenty to thirty-two feet long; and *leather cincha*, with *lash-rope* five-eighth inch whale-line forty-two feet long.

1147. Q. What does a "full-rigged" saddle have? A. *Sling-straps* and *cargo-cincha* in place of the sling and lash-ropes.

1148. Q. Describe how the rations should be packed for loading. A. In one hundred pound packs, lashed solidly, each pack being plainly marked with its weight and contents. Salt, sugar, coffee, and beans are double sacked and lashed in one hundred pound packages. Bacon, in one hundred pound packages, is packed in from five to eight pounds of clean straw or hay, double sacked, and lashed firmly. The yeast-powder cases should be

opened, and hay or straw stuffed closely around the boxes to prevent shaking.

1149. Q. How many packs in each cargo, and weight of same? A. Two side-packs of about one hundred to one hundred and twenty-five pounds each, and should match in size, shape, and weight as nearly as possible.

1150. How should ammunition be carried? A. In cargoes by itself.

1151. Q. How should packers work (what number together)? How designated? Give their positions. A. By threes, designated Nos. 1, 2, and 3. No. 1 is on the near side, No. 2 on the off side of the mule; when No. 3 works with No. 1, he is nearest the croup; when with No. 2, he is opposite the mule's shoulders.

1152. Q. Describe the placing of the mule for packing. A. The mule is placed near to, and with its left side next to the cargo by No. 2, who then puts on the blind.

1153. Q. Describe in detail the loading of the cargo as far as and including *Settle*. A. No. 1, on the near side, passes the centre of the sling-rope over the saddle to the off side far enough to allow the rope to pass over the off-side pack and come back within his reach, the parts of the rope separated by six to twelve inches. Nos. 2 and 3 take the off-side pack, place it well up on the saddle; No. 2 grasps the loop of the sling-rope with his right hand, brings the rope up against the pack and lets the loops drop over his right shoulder, in readiness to pass it over the pack; No. 2 holds the pack in place. No. 3 passes to the near side, and with No. 1 takes the near side-pack and places it, flat side next the mule, well up on the saddle, lapping the upper edge well over the upper edge of the off-side pack. No. 1, with his back to the mule's shoulder, takes the end of the front part of the sling-rope, passes it from the outside through the loop, and pulls it down with the right hand; he now grasps the rear end of the sling-rope with the left hand, and ties the ends together in a square bow-knot, the packs high up. No. 1 calls out: *Settle*; No. 1 and No. 2 each grasps his side of the cargo by the lower corners, lifts upward and outward, settling the upper edges well together and balancing the load.

1154. Q. How many men are necessary to unload a cargo? A. Two, Nos. 1 and 2.

1155. Q. What should be done before taking the saddles off the mules? A. Cinchas should be slackened and the mules allowed to cool.

## ADDITIONAL FOR FIRST LIEUTENANTS OF CAVALRY.

### EVOLUTIONS OF THE REGIMENT.

1156. Q. How are the squadrons designated? A. In whatever direction the regiment faces, the squadrons are designated from

the right in line and from the head in column, *first squadron, second squadron, and third squadron.*

1157. Q. How are the troops designated by the colonel? A. As *first* (or such) *troop, first* (or such) *squadron, etc.*

1158. Q. If the regiment is in two lines, how are the squadrons designated? A. From the right in the first line, *first and second*; in the second line, *third.*

1159. Q. Give the position of the colonel in the various formations. A. In line, and in line of columns, he takes post sixty yards in front of the centre of the regiment; in line of masses, thirty yards in front of the centre of the regiment. In column, sixty yards, and in column of masses, thirty yards from the centre of the column, on the side of the guide.

1160. Q. Give the position of the band. A. In line, the left of its front rank is sixteen yards to the right and in line with the rank of the first squadron. In column, it is sixteen yards in front of the officers of the leading subdivision.

1161. Q. Where is the guard of the standard posted? A. As the left four of the centre or right centre troop of the centre squadron, or of a single squadron; if there be but two squadrons, it is posted as the left four of the left troop of the first squadron.

1162. Q. Where is the position of the colonel and staff in route marches? A. At the head of the column accompanied by the staff, except the surgeons and quartermaster, and by the non-commissioned staff, regimental non-commissioned officers, and orderlies. The lieutenant-colonel and the surgeons are in rear of the column, or as the colonel may direct. The quartermaster and quartermaster sergeant are with the train.

1163. Q. How may the regiment be formed? A. In line, in line of platoon columns, or in line of masses, in separate lines, or in echelon in any combination of the above formations.

1164. Q. What is the interval between squadrons in line? A. Sixteen yards.

1165. Q. Being at a halt *to march in line*, give the commands of the colonel. A. 1. Forward; 2. Second (or such) the base squadron; 3. March.

1166. Q. In this movement, what are the commands of the majors? A. The major of the designated squadron commands, Guide centre; majors of squadrons on its right command, Guide left; majors of squadrons on its left command, Guide right.

1167. Q. If the colonel wishes to wheel the line about by fours and halt, what are his and the majors' commands? A. The colonel's commands are: 1. Face to the rear; 2. Fours right (or left) about; 3. March. Each major halts his squadron as the fours unite in line.

1168. Q. In successive formations of the regiment, what is

the rule upon the completion of a movement? A. It should find the regiment halted.

1169. Q. What is the normal distance between squadrons in two or more lines or in column of squadrons? A. Squadron front and seventeen yards.

1170. Q. What is the distance between squadrons in column of fours? A. Seventeen yards.

1171. Q. Being in column of fours, give commands of the colonel to form *in two lines to the right*, and describe the movement. A. 1. In two lines; 2. Fours right; 3. Third squadron, second line; 4. March. The first and second squadrons form line to the right and halt. The third squadron inclines to the left until it gains the required distance, when it resumes the original direction, and is formed in line to the right and halted with its centre in rear of the centre of the first line.

1172. Q. Being in column of fours, give commands of the colonel to form *on right into line by squadrons*, and explain movement. A. 1. On right into line by squadrons; 2. March. The first squadron is wheeled by fours to the right and is halted after advancing thirty yards; each of the other squadrons marches beyond the one preceding, is wheeled by fours to the right at its proper interval, and is halted on the line.

1173. Q. Being in column of fours, give commands of the colonel to form *right front into line in two lines*, and explain movement. A. 1. In two lines; 2. Right front into line; 3. Third squadron, second line; 4. March. The first and second squadrons execute right front into line. The third squadron inclines to the right, and forms right front into line in rear of the first line.

1174. Q. Being in column of fours, give commands of the colonel to form line by two movements—the column having partly changed direction to the right, and he wishes to form line to the left—and explain. A. 1. Fours left; 2. Rear squadrons, left front into line; 3. March. The squadron that has changed direction to the right forms line to the left and halts; the squadrons in rear execute left front into line, the leading fours advancing only so far as to be in line with the squadron that formed line to the left.

1175. Q. Being in line, give commands of the colonel to ploy in *column of masses on the first troop of the first squadron*, and explain. A. 1. Column of masses; 2. On first troop, first squadron; 3. March. The first squadron ploys into close column on its first troop; the other squadrons wheel by fours to the right, incline to the right, and each marches so that its leading troop may enter the column at troop distance and fifteen yards in rear of the rear troop of the preceding squadron. The second squadron ploys faced to the left in rear of the first, and the third ploys in rear of the second; the left guides cover.

1176. Q. Being in column of masses, give commands of the colonel to *change direction by the right flank*, and explain movement. A. 1. Change direction by the right flank; 2. March. The first squadron changes direction as prescribed in the school of the squadron; each of the others wheels by fours to the right, is marched with the guide to the left, by two partial changes of direction to the left, to its position in the new column, and is then wheeled by fours to the left and halted.

1177. Q. Being in column of masses, give commands of the colonel to *deploy to the right and left*, and explain movement. A. 1. Deploy column; 2. Fours right and left (or left and right); 3. March. The first squadron deploys to the right; the second and third deploy on the line, the second to the left of the first, and the third to the left of the second.

1178. Q. Being in column of masses, give commands of the colonel to *deploy in three lines*. A. 1. Squadrons; 2. Deploy column; 3. Fours right (or left); 4. March.

1179. Q. Being in column of masses, give commands of the colonel to *march to the right in line of squadrons in columns of fours*. A. 1. Squadrons; 2. Columns of fours; 3. First troop; 4. Fours right; 5. March; 6. First (or such) the base squadron.

1180. Q. Being in line, give commands of the colonel to *ploy into column of squadrons on second squadron*, and explain. A. 1. Column of squadrons; 2. On second squadron; 3. Fours left and right; 4. March. The second squadron stands fast; the first squadron executes fours left and forms line to the right in rear of the second; the third executes fours right and forms line to the left in rear of the first; the right flanks cover.

1181. Q. What is the interval between squadrons in line of masses, and what are the posts of the majors? A. Forty-eight yards; each major takes post twenty yards in front of the centre of his first troop.

1182. Q. Being in line, give commands of the colonel to *form line of masses*, and explain. A. 1. Line of masses; 2. On first troop, first squadron; 3. March. The first squadron ploys into close column on its first troop; the second squadron moves by the right flank and ploys into close column faced to the left so as to have forty-eight yards' interval from the left flank of the first; in the same manner the third ploys on the left of the second.

1183. Q. Being in column of fours, give commands of the colonel to *form on right into line of masses*, and explain the movement. A. 1. On right into line of masses; 2. March. The major of the first squadron commands: 1. Column right; 2. March; and his first troop having advanced sixty yards in the new direction, he commands: 1. Close column; 2. First troop; 3. Column left; 4. March. Each of the other squadrons passes in rear of and beyond the one preceding, and executes the same



movement as explained for the first, so as to have the interval of forty-eight yards from the squadron on its right.

#### EXTENDED ORDER.

1184. Q. What are the principles for movements in extended order and to fight on foot? A. The same as for the squadron.

1185. Q. Supposing the deployment to be from line, what is the colonel's action? A. He designates the troop and squadron on which the deployment is to be executed; the designated deploys as directed; each of the other squadrons is marched by the flank until opposite its place in the line, when it is deployed on the troop nearest the designated squadron.

1186. Q. How if the deployment be from column? A. The leading squadron deploys; each of the others is conducted opposite its place on the line and is then deployed to its right or left front.

#### THE REGIMENT IN BRIGADE.

1187. Q. In battle, how is the regiment dismounted usually formed? A. In two lines; two squadrons formed for dismounted action constitute the fighting line.

1188. Q. What is the third squadron, and where is it posted? A. It is the regimental reserve, and is posted about 600 yards in rear of the firing line.

1189. Q. Give the position of the colonel. A. Near the centre of the line of the squadron reserves of the first line; if called elsewhere, he indicates his position.

1190. Q. Explain the duty of the reserve squadron. A. It reinforces the fighting line as circumstances require. If the firing line be driven back, the reserve squadron is formed in a selected position to check the enemy and to enable the firing line to reform.

1191. Q. When should the entire regimental reserve be ordered on the firing line? A. At the time for assault; and its arrival should be the signal for the advance. It should then be replaced by a squadron from the brigade reserve.

#### FOR CAPTAINS.

(In addition to what is prescribed for First Lieutenants.)

#### THE BRIGADE.

1192. Q. How many regiments are there in a brigade? A. Three; but there can be more or a less number in one.

1193. Q. How are the regiments designated in line, also in column? A. *Right, centre, and left*; or, if one be in rear, *right,*

*left*, and *rear*; in column they are designated *leading*, *centre*, and *rear*.

1194. Q. What is the interval between regiments, and what additional interval is allowed for a battery? A. Sixty-four yards; an additional interval of one hundred yards between regiments or squadrons should be allowed for the battery.

1195. Q. Give the post of the general in line and in column. A. In line, one hundred yards in front of the centre of the brigade; in column, at the head of the brigade.

1196. Q. Who is the general attended by? Give their posts, also of other staff officers. A. He is attended by his adjutant general, riding on his left, and his aides, six yards in rear. The remaining officers of his staff ride on the left or in rear of the aides, according as they form one or more ranks, the senior on the right.

1197. Q. Where must the flag be carried and orderlies ride? A. Three yards in rear of the staff.

1198. Q. What should the drill exercises be limited to? A. To movements used in campaign.

1199. Q. What part of the drill regulations are applicable to the brigade? A. Evolutions of the regiment.

1200. Q. What points should the orders of a general to a regimental or battery commander cover? A. First. The manœuvre to be executed by the brigade. Second. The particular formation the regiment is to take; as, *in two lines*, *line of masses*, etc. When the formation is not specified, the regiment forms in line. Third. When forming the brigade in two or more lines by regiment, the order should state the number of lines, the distance between the lines, the line in which the regiment is to form, and its point of rest. Fourth. Whether the right or left of the regiment is to connect with the left or right of another regiment that precedes it on the line. Fifth. Whether the battery is to be on the right or left of the regiment. Sixth. Whether the right or left flank of the regiment will be exposed.

1201. Q. How is the point of rest indicated? A. When necessary by staff officers.

1202. Q. Being in column of fours, what are the general's orders to form *front into line*? A. To each colonel: *The brigade to form front into line*; to the leading regiment: *Form right front into line*; to the centre regiment: *Form left front into line, your right, with interval for battery, connecting with left of leading regiment*; to the rear regiment: *Form right front into line, your left connecting with right of leading regiment, your right flank exposed*; to the battery: *Take position on left of (such) regiment*.

1203. Q. Explain the action of the colonels and battery commander in carrying out the foregoing orders of the general. A. The colonel of the leading regiment forms it right front into line;

the colonel of the centre regiment marches it forward to the line, to the left of the leading regiment, so as to have an interval of one hundred and sixty-four yards, and forms it left front into line; the colonel of the rear regiment marches it forward to the line, to the right of the leading regiment, and forms it right front into line; the captain of the battery marches it to its position to the left of the leading regiment.

1204. Q. Being in column of fours, what orders are given by the general to form line to the right, and what are the commands of the colonels? A. The general sends order: *Form line to the right*. The colonels command: 1. Fours right; 2. March; 3. Squadrons; 4. Halt.

1205. Q. How are changes of front usually executed? A. By forming in column of fours and then forming front into line.

### THE DIVISION.

1206. Q. What does the division consist of, and by whom commanded? A. Three brigades of cavalry and two or more batteries of horse artillery; it is commanded by a major-general.

1207. Q. Give the post of the division commander in line and in column. A. In line, one hundred and fifty yards in front of the centre of the division; in column, at the head of the division.

1208. Q. How are the brigades designated, and how are they posted? A. In line, *right*, *centre*, and *left*; or if one be in rear, *right*, *left*, and *rear*; in column, *leading*, *centre*, and *rear*. Unless otherwise directed, the brigades are posted according to the rank of brigade commanders, in the manner prescribed for posting regiments in the brigade.

1209. Q. What principles apply for the evolutions of the division? A. The same as for a brigade.

1210. Q. What is the interval between brigades? A. Ninety-six yards, which is increased whenever necessary for artillery.

### THE CORPS.

1211. Q. What does a corps consist of, and what principles apply for the evolutions of the same or a large command? A. Three divisions of cavalry. The principles prescribed for the evolutions of the division.

### CEREMONIES.

#### GENERAL RULES.

1212. Q. What is the general rule for the arrangement of troops, except funeral escorts, on occasions of ceremony? A. First, infantry; second, light artillery; third, cavalry. Artillery

serving as infantry is posted as infantry; dismounted cavalry and marines are on the left of the infantry; engineer troops are on the right of the command to which they are attached.

1213. Q. In rendering honors, at the command *Present arms*, how is the command executed by cavalry armed with the carbine, or carbine and pistol only? A. By executing *advance carbine*.

#### GENERAL RULES FOR REVIEWS.

1214. Q. How are the points marked; in what manner, and by whom, for changes of direction? A. By men or otherwise; in such manner that the right flank of the column in passing shall be about ten yards from the reviewing officer; by the adjutant or adjutant-general.

1215. Q. How is the post of the reviewing officer marked, and when should he be there? A. By a flag opposite the centre of the line; the reviewing officer should be there before the head of the column reaches that point; before that time he may take any position to observe the movements of the troops.

1216. Q. How, and by whom, is the standard saluted in passing the reviewing officer? A. By uncovering; by the reviewing officer, his staff, and others accompanying him. This is done whether the standard salutes or not.

1217. Q. Whom in the column does the reviewing officer salute? A. He salutes (returns the salute of) commanders of squadrons, batteries, and battalions, and all higher units.

1218. Q. Give the post of the reviewing officer's staff at reviews. A. Six yards in rear of him, in the following order from right to left: chief of staff, adjutant-general, aides, then the other members of the staff in the order of rank, the senior on the right; his flag and orderlies place themselves three yards in rear of the staff, the flag on the right.

1219. Q. At what time do commanders of brigades and divisions take their places in column? A. In time to allow the commanders in front of them to take their places when at one hundred yards from the reviewing officer.

1220. Q. Who repeat the commands of the brigade commanders? A. The colonels.

1221. Q. When the colonel faces the line to give commands, what is the rule for the majors? A. They face at the same time; they repeat the commands, which are then executed; they resume their front after seeing the movements executed.

1222. Q. When the command is *Present sabre*, repeated by the majors, when does the colonel's staff salute, and when do the colonel and majors salute? A. At the command of the colonel. After resuming their front.

1223. Q. In line, at the command, *Prepare for review, march*,

where does the standard-bearer take post? A. In front of his position, on the line of troop officers.

1224. Q. When the rank of the reviewing officer entitles him to the honor, when does the standard salute? A. At the command *Present arms*, repeated by the major of the squadron with which it is posted, and again in passing in review, when it is six yards from the reviewing officer; the standard is raised when it has passed six yards beyond the reviewing officer.

#### ESCORT OF HONOR.

1225. Q. For what purpose are escorts of honor detailed? A. For the purpose of receiving and escorting personages of high rank, civil or military.

1226. Q. How are troops selected for escorts? A. For their soldierly appearance and superior discipline.

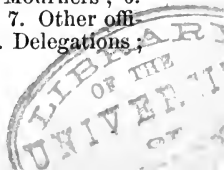
1227. Q. Describe the manner of receiving, escorting, etc., in detail, the person to be escorted. A. The escort forms in line, opposite the place where the personage presents himself, the band on the flank of the escort toward which it will march. On the appearance of the personage, he is received with the honors due to his rank. The escort is formed into column of troops, platoons, or fours, and takes up the march, the personage and his staff or retinue taking position in rear of the column. On leaving the escort, line is formed, and the same honors are paid as before. When the position of the escort is at a considerable distance from the point where the person is to be received, as, for instance, where a court-yard or wharf intervenes, a double line of sentinels is posted from that point to the escort, facing inward; the sentinels successively salute as he passes, and are then relieved and join the escort. An officer is appointed to attend him, to bear such communications as he may have to make to the commander of the escort.

#### FUNERAL ESCORTS, DISMOUNTED.

1228. Q. To receive the coffin, how is the escort formed, and what is done on its appearance? A. The commander commands: 1. Carry; 2. Arms; 3. Present; 4. Arms. The band plays appropriate music; arms are then carried, after which the coffin is taken to the flank of the escort opposite the band.

1229. Q. How is the escort formed? A. In column of troops, platoons, or fours. If the escort be small, it may be marched in line.

1230. Q. Give the order of the procession. A. 1. Music; 2. Escort; 3. Clergy; 4. Coffin and pall bearers; 5. Mourners; 6. Members of the former command of the deceased; 7. Other officers and enlisted men; 8. Distinguished persons; 9. Delegations;



10. Societies ; 11. Civilians. Nos. 6 and 7 are with side arms, in the order of rank, seniors in front.

1231. Q. At the funeral of a mounted officer or enlisted man, what follows the hearse? A. The horse of the deceased, in mourning caparison.

1232. Q. The escort being in march, how are the arms carried? A. At the right shoulder.

1233. Q. On reaching the grave, describe what follows. A. Line is formed facing the grave. The coffin is then carried along the front of the escort to the grave, arms are presented, and the band plays appropriate music ; the coffin having been placed over the grave, the music ceases and arms are brought to the order. The commander next commands : 1. Parade ; 2. Rest. The escort executes *parade rest*, officers and men inclining the head to the front. After the funeral services, and the coffin is lowered in the grave, the commander of the escort causes the escort to resume attention and fire three rounds of blank cartridges. A trumpeter then, at the head of the grave, sounds *taps*. The escort is then formed into column, marched in quick time to its place of assembly, and dismissed.

#### FUNERAL ESCORTS, MOUNTED.

1234. Q. How are the ceremonies conducted? A. According to the principles prescribed when dismounted, except that while mounted the sabre is drawn, and honors are rendered by presenting sabre. When the cavalry are to fire the salute over the grave it is dismounted, as prescribed to fight on foot, assembled, and marched to the grave, where the ceremonies are completed as prescribed when dismounted.

## PART VI.

### *DRILL—LIGHT ARTILLERY.*

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TEXT-BOOK—*U. S. Drill Regulations.*

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FOR SECOND LIEUTENANTS OF ARTILLERY—Nos. 1235-1584.

FOR FIRST LIEUTENANTS OF ARTILLERY—Nos. 1235-1693.

FOR CAPTAINS OF ARTILLERY—Nos. 1235-1693.





## PART VI.

### DRILL REGULATIONS—LIGHT ARTILLERY.

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#### GENERAL PRINCIPLES.

1235. Q. How are the commands for the instructor given, and how are the movements in the drill regulations explained? A. The commands are given for the execution of the movements toward both the right and left flanks; but the movements are explained toward one flank only, it being only necessary to substitute "left" for "right," or the reverse, for a corresponding movement on the other flank.

1236. Q. How may all movements be executed that are not prescribed from a halt or on the march? A. Either at a halt or marching.

1237. Q. By what means may movements on foot in double time be executed? A. All those not specially excepted may be executed in double time, the command *double time* preceding the command *march*; if marching in double time, the command *double time* is omitted.

1238. Q. By what means may all mounted movements be executed at a trot or gallop? A. All those not specially excepted may be executed at a trot or gallop, the commands *trot* or *gallop* preceding the command *march*; if marching at a trot or gallop, the command *trot* or *gallop* is omitted.

1239. Q. How should the gait be increased in mounted movements? A. Progressively, the trot being executed from a walk, and the gallop from a trot; if at a gallop, the trot will be executed before the walk is resumed.

1240. Q. What determines the execution of commands when movements are separated into motions for purposes of instruction? A. The last syllable of the command determines the prompt performance of the first motion, and the commands *two*, *three*, etc., that of the other motions.

1241. Q. By what commands are movements executed in detail? A. The instructor first commands, *By the numbers*, and all move-

ments divided into motions are then executed until he commands, *Without the numbers.*

#### COMMANDS.

1242. Q. Describe the number and kinds of commands for the execution of movements. A. There are two kinds: the *preparatory*, which indicates the movement that is to be executed; and the command of *execution*, which causes the movement to commence.

1243. Q. How should commands be given? A. The tone should be animated, distinct, and of a loudness proportioned to the number of men under instruction. Each preparatory command is pronounced in an ascending tone of voice, but in such manner that the command of execution may be more energetic and elevated.

1244. Q. In what manner should the commands given on foot and while mounted vary? A. On foot the command of execution should be pronounced in a tone firm and brief. In mounted movements the preparatory commands are more or less prolonged to insure their being heard; the command of execution should be always prolonged.

#### SCHOOL OF THE SOLDIER, DISMOUNTED.

(For questions in this school, any from 717 to 727 and from 753 to 786).

#### SCHOOL OF THE CANNONEER.

1245. Q. What are cannoneers? A. Men assigned to the service of the guns.

1246. Q. What constitutes a gun detachment? A. The cannoneers belonging to a single gun formed in double rank.

1247. Q. How many men compose a gun detachment for a 3.2-inch gun, and how is the detachment formed? A. Two corporals and five privates, formed in double rank, and told off from the right, No. 1 being on the right of the rear rank; No. 2 in front of No. 1; No. 3 on the left of No. 1; No. 4 on the left of No. 2, and so on—the even numbers in the front rank and the odd numbers in the rear rank. The senior corporal, who is gunner, is on the right of No. 2; the junior corporal, who is the caisson corporal, is on the left of the front rank, covered by the highest odd-numbered cannoneer.

1248. Q. How are the men of a gun detachment arranged in actual service? A. They are permanently assigned to the duties for which they are best fitted.

1249. Q. How is the detachment told off? A. The command *Call off* is given, and each man belonging to the detachment,

beginning with the gunner, calls off: *Gunner, One, Two, etc., Caisson corporal.*

1250. Q. What is the front of a piece? A. Of a piece limbered, of a limber, or of a caisson, it is the direction in which the pole points; of a piece unlimbered, it is the direction in which the muzzle points.

1251. Q. How is the gun detachment posted when in front and in rear of a piece limbered? A. It is in line facing to the front (when in front), its rear and centre two yards from the end of the pole, or from the heads of the lead horses. When in rear, it is in line facing to the front, its front and centre two yards from the muzzle.

1252. Q. How is the gun detachment posted with its piece? A. The instructor commands, *Detachment, opposite your piece*; and as the detachment arrives opposite its piece, the gunner halts it, and directs, *Left (or right) face, right dress, front.* The gunner aligns the detachment always.

1253. Q. In changing the position of the gun detachment at the limbered piece from front to rear or rear to front, in what manner do the men reach the new position? A. In moving to the rear, Nos. 1, 2, 3, and 4 oblique sufficiently to the left, and the other cannoneers, if any, and the caisson corporal, sufficiently to their right to move along the sides of the piece, reunite in a similar manner as soon as they have passed the muzzle, are halted, faced about, and dressed to the right by the gunner. If changing from rear to front, the gunner and Nos. 1, 2, 3, and 4 go to the right and the others to the left, and unite in similar manner.

1254. Q. What is the position of the cannoneers at a limbered piece? A. Nos. 1 and 2 opposite the gun-axle; the gunner and No. 3 opposite the middle of the flask. Nos. 4 and 5 opposite the limber axle. All face to the front and cover each other in lines one yard outside the wheels, the gunner and even numbers on the right, the odd numbers on the left.

1255. Q. What is the position of the caisson corporal dismounted? A. He is on the left of the caisson, in line with the limber axle and one yard outside of it; he faces in the direction the pole of the caisson points.

1256. Q. What is the position of supernumerary cannoneers, if there are any present? A. Nos. 6, 7, and 8 are at the caisson, facing in the same direction as the caisson corporal. No. 6 is on the right, corresponding to that of the caisson corporal on the left. Nos. 7 and 8 are in line with the axle of the caisson body, covering the caisson corporal and No. 6 respectively. When pieces are not accompanied by caissons, Nos. 6 and 7, if present, are opposite the double-tree of the piece, one yard from it, facing to the front, No. 6 on the right and No. 7 on the left.

1257. Q. What is required of the cannoneers, with regard to the horses, when projectiles are fired? A. One cannoneer in

each platoon is required to hold the horses of the chief of platoon and chiefs of sections. No. 6 of one of the pieces, ordinarily the left, performs this duty.

1258. Q. What command is given to post cannoneers at the piece limbered from front and rear, and by whose order is the movement made and completed? A. The detachment being at the front or rear, the command is, *Cannoneers, to your posts, march*. The instructor gives the first command and the gunners complete the movement by commanding, *Right face, to your posts*, before the command *March*.

1259. Q. By what commands may the detachment be re-formed in front or rear, piece limbered, cannoneers at their posts? A. By the command *Detachment front (or rear), march*. The gunner commands, in the first case, *Forward*, and repeats the command *March*, and places the men in front by the command *Column left, march; detachment, halt; right face; right dress; front*. In the movement to the rear, at the first command of the instructor, the gunner commands, *Detachment, about face; forward*, and repeats the command *March*, and posts the men in rear by the same commands as for posting them in front, substituting *left face* for *right face*.

1260. Q. In moving the piece by hand, piece limbered, what is done at the command *Forward*? A. Nos. 4 and 5 hasten to the end of the pole and seize it with both hands; the gunner and No. 3 take hold of the spokes of the limber wheels with both hands, and Nos. 1 and 2 the spokes of the gun wheels. Those who take hold of the spokes of the wheels break to their rear with the feet nearest the carriage.

1261. Q. If, in moving the piece by hand, piece limbered, Nos. 6 and 7 are with the piece, what is their duty? A. They go to the end of the pole, Nos. 4 and 5 assist the gunner, and No. 3 at the limber wheels.

1262. Q. Describe the position of the cannoneers at the piece unlimbered. A. The gunner is at the left and at the end of the trail handspike, right leg nearly touching it and heels on a line with the end; No. 1 is facing the piece, the right hip on line with the rear of the right wheel and two feet outside of it; No. 2 is at the left wheel, in position corresponding to that of No. 1 at the right; No. 3 is in rear of the post of No. 1, opposite the end of the trail-handspike and facing to the front; No. 4 is five yards in rear of No. 2 and facing to the front; No. 5 is behind the limber.

1263. Q. In how many different positions may the piece be unlimbered by command and prepared for firing, and what are they? A. Four—*action front, action rear, action right, and action left*.

1264. Q. In bringing the piece into the position of *action front*, what are the gunner's duties? A. At the command *Front* he

takes out the pintle-key and seizes the trail-handle on his side ; with the assistance of No. 3 at the opposite trail-handle he raises the trail from the pintle-hook and commands, *Drive on* ; as soon as the limber moves off, the piece is brought about (Nos. 1 and 2 at the gun-wheels) ; the gunner and No. 3, without lowering the trail, carry it around 180 degrees, so that the limber passes the muzzle, when the trail is lowered to the ground ; the gunner then turns the trail-handspike to the rear and pushes it forward so as to engage the blades in the catch.

1265. Q. In *action front*, how is the limber placed in position and when do cannoneers take post ? A. At the command *Drive on*, the limber executes a left about, proceeds to the rear and executes another left about so as to be directly in rear of the piece to which it belongs, with the end of the pole or heads of lead horses (when used) ten yards from the end of the trail-handspike. If the piece be not horsed, the limber, when moved, is drawn by Nos. 4 and 5, who take hold with both hands near the end of the pole. If Nos. 6 and 7 are posted with the piece, the limber will be drawn by them ; if the piece be heavy or the ground bad Nos. 4 and 5 will assist Nos. 2 and 1. The cannoneers take post as soon as the gun is in position, without command.

1266. Q. What change in *action right* takes place in what is described for *action front* ? A. No. 1 faces about instead of No. 2, and turns his wheel toward the muzzle and No. 2 turns his toward the trail ; the trail is carried only 90 degrees in the opposite direction, and the limber wheels to the left and takes its place in rear by a left about.

1267. Q. What change in *action left* takes place in what is described for *action front* ? A. The trail is carried around 90 degrees and the limber wheels to the right and takes its place in rear by a right about.

1268. Q. What change in *action rear* takes place in what is described for *action front* ? A. As soon as the limber moves off, the trail is let down and the piece prepared for action ; the limber moves directly forward at the command *Drive on*, and takes its place by a reverse.

1269. Q. What is the position of a limber in battery faced to the rear, and how is it placed there ? A. The back of the limber is ten yards from the end of the trail-handspike. Whenever this position is to be taken the instructor cautions, *Limber faced to the rear*, before giving the command *Action front*, etc.

1270. Q. Where are the equipments carried ? A. Two cartridge-pouches and one gunner's sight-pouch are on top of the cartridges in the limber-chest ; one gunner's sight in limber-chest in the place prepared for it ; two primer-pouches in the trail-box.

1271. Q. What is done at the command *Take equipments*, and when may this command be given ? A. The gunner repeats the

command and Nos. 1, 2, 3, and 4 approach him. He hands 1 and 3 each a primer-pouch, which they fasten to the waist-belt in front of the right side; to 2 and 4 each he hands a cartridge-pouch, which they sling over the left shoulder and under the right arm; the gunner then places the sight in his pouch, which he slings over his left shoulder and under his right arm. Nos. 1, 2, 3, and 4 then resume their posts. The equipments may be distributed or replaced either when the cannoneers are at their posts, piece limbered, or when the gun detachment is at its post in rear.

1272. Q. How should recruits, the cannoneers being at their posts, piece unlimbered, be first instructed? A. The instructor should assemble them about the piece, tell them the meaning of the terms cannon and piece, point out and name the principal part of the gun, the breech mechanism, gun-carriage, limber and caisson, give the name and explain the uses of the various equipments, implements, and tools, and show where they are carried, and explain the method of working the breech mechanism.

1273. Q. In what order are the duties of the different men taught in loading and firing? A. First, those of the gunner: commanding, opening and closing the breech, inserting the charge, and pointing. Second, those of No. 1: attending the brake, ramming and firing. Third, those of No. 2: attending the brake and serving the ammunition. Fourth, those of No. 4: serving ammunition. Fifth, those of No. 3: assisting the gunner. Sixth, those of No. 5: preparing and serving ammunition.

1274. Q. The breech being open, how is the loading of the piece explained by the instructor? A. The projectile is first inserted, then the cartridge, choke foremost; the projectile is pushed by hand until its base is beyond the seat of the gas-check; the rammer-head is then placed against it, and it is rammed smartly to drive it home to its seat in the bore, where it will grip the lands and its base will be at the junction of the bore with the chamber, which is designed for the cartridge alone; the cartridge is then pushed in by hand and is not rammed.

1275. Q. Describe the method of opening the breech of a 3.2-inch gun. A. Seize the lever with the left hand, thumb down, and raise it as high as possible to release it from the safety-notch; then turn it to the left until the block strikes the stop, at which time the threaded sections of the block are opposite the planed sections of the seat; the breech-block handle is then grasped with the right hand, back down, the block is drawn out and swung to the left to clear the bore.

1276. Q. What is done if the block sticks in opening the breech of a 3.2-inch gun? A. The lever should be pressed down with the left hand, and, as the cam is no longer opposite the safety-

notch, it will bear against the face of the carrier-ring and start the block to the rear.

1277. Q. Describe the method of closing and locking the breech of a 3.2-inch gun. A. Seize the lever with the left hand, raising it as high as possible, grasp the breech-block handle with the right hand, back down, and swing the block gently around, keeping the lever extended as in opening, and push the screw into its place; then turn the lever to the right until it will fall into its place with a very slight pressure; see that the end of the lever engages in the slot. Never attempt to force the lever down; if it does not move comparatively freely, the breech-screw is not in place and requires to be moved still further to the right.

1278. Q. What should be done if the latch fails to work in closing the breech of a 3.2-inch gun? A. The latch is an auxiliary, but not an absolutely essential part of the breech mechanism. If it fails to work, it may be removed by taking off the latch-cover. This should never be done, however, except when necessary.

1279. Q. In firing a 3.2-inch gun, what care should be taken when the latch has been removed? A. Not to attempt to push the block home until its axis is in line with the axis of the gun. In opening the block, the carrier-ring must be held in place by hand until the block is withdrawn to the stop.

1280. Q. When the instructor does not wish to fire immediately after the piece is loaded, what does he caution? A. Before giving the command to load he cautions, *Without making ready.*

1281. Q. What are the general duties of the gunner? A. He sees that the other cannoneers perform their duties properly; that the projectiles prescribed are used; that the fuses are properly prepared; and that the breech-sight is set for the range and deflection given. He is responsible that the gun, and especially the breech mechanism, is in good order before loading, and that the breech-block is properly locked after loading.

1282. Q. What must the gunner do at the command *Load*? A. He takes hold of the handspike, looks over the top of the piece, and gives the general direction to the gun; then steps to the breech, opens and inspects the bore, breech, mechanism and gas-check to see that all are in good order; he examines the face of the carrier-ring and its seat, and removes with the wiping-cloth any deposit observed upon them; he then receives the projectile from No. 2 or 4, inserts it in the bore, point foremost, and pushes it by hand and until its base is just beyond the seat of the gas-check, and as soon as No. 1 has rammed the projectile, inserts the cartridge, choke foremost, pushes it home with his hand and closes the breech. He then takes the breech-sight from its pouch and places it in its socket, grasps the handle of the elevating-screw with the right hand, draws back his right foot, bends over his left knee and points the piece. He may straddle the flask in pointing if more convenient to him. He taps the right of the

trail for No. 3 to move it to the left, and the left of the trail for him to move it to the right. As soon as the gun is pointed he raises both hands as a signal to that effect, removes the sight, takes his post and replaces the sight in its pouch.

1283. Q. Explain the method of sponging a piece. A. At the command *Sponge*, No. 2 steps between the wheel and the flask, and No. 1 runs to the front of the piece; No. 2 unkeys the jointed sponge-staff and, assisted by No. 1, opens it; No. 2 then inserts the rammer-head and passes it through the bore from rear to front; as soon as the staff projects beyond the muzzle it is seized by No. 1, who draws the sponge through the bore; No. 2, assisted by No. 1, then closes the staff, No. 2 keys it up, and both numbers resume their posts.

1284. Q. Describe how a load may be withdrawn from a piece. A. No. 2 unkeys and, assisted by No. 1 (who runs to the front of the piece), opens the jointed staff; No. 1 takes the staff and No. 2 resumes his post outside the wheel; the gunner steps to the breech, opens it, takes out the cartridge and then the projectile, and passes them to No. 4, who takes them back to the chest from which they were issued. No. 1, as soon as the cartridge has been removed, inserts the rammer-head, gently taps the projectile to loosen it, and then pushes it back into the chamber. If the projectile to be removed has a percussion-fuse, it should not be tapped. If it cannot be pushed back by a steady pressure, it must be gotten rid of by discharging the piece. No. 2, assisted by No. 1, closes the staff, No. 2 keys it up, and both resume their posts.

1285. Q. The piece being unlimbered, explain the method of changing posts. A. At the command *Change posts*, all the cannoneers who have equipments take them off and lay them down in front of them; Nos. 1 and 5 face to the left (No. 5 faces to the right if the limber is faced to the rear); No. 3 faces about. At the command *March*, 1 takes the place of 3; 3 takes the place of 5; 5 takes the place of 4; 4 takes the place of 2; 2 takes the place of 1, stepping over the flask. As soon as posts are changed, equipments are resumed without orders.

1286. Q. How are the changes of the posts of cannoneers effected when the piece is limbered? A. The changes are made the same as when the piece is unlimbered, except that No. 4 in changing passes outside the gunner.

1287. Q. How is the piece brought about in *limber front*? A. The gunner and No. 3 spring to the end of the trail-handspike; both raise it and carry it 180 degrees to the left; No. 1 takes the position for *by hand to the rear*, brings the right wheel around, turning it towards the trail; No. 2 takes the position of *by hand to the front*, and brings the left wheel around, turning it toward the muzzle. The instant the piece is about, the trail is let down; the gunner turns the trail-handspike over on the flask and secures it. To avoid accident from the movement of the limber Nos. 1



and 2 step inside the wheels and place themselves with their backs against the axle-seats, and No. 3 and the gunner step directly in front of them, respectively. As soon as the limber is in front of the piece the gunner commands, *Limber halt*, and he and No. 3 spring to the trail-handles and raise the trail; Nos. 1 and 2 spring outside the wheels and seize the spokes; all run the piece forward; the lunette is placed upon the pintle-hook and keyed by the gunner, and all take posts at the piece limbered.

1288. Q. In what respect does *limber left* differ from that of *limber front*? A. It is executed the same, the trail being carried only 90 degrees to the left, and the limber inclining to the left and taking its place by a left wheel. If the limber is facing to the rear, it executes a right about and then goes to its place.

1289. Q. Describe how to *fix prolonge*? A. The limber inclines to the right and takes its place as in limbering to the rear, halting about four yards from the trail of the piece. Nos. 1 and 3 uncoil the prolonge and pass both ends to the gunner, who passes the hook upward through the lunette and then engages the hook in the ring about one yard from the lunette. No. 5 pulls the double prolonge taut, sees that the joined hook and ring are at least one yard from the lunette, makes a loop at his end and passes it over the pintle-hook and puts in the key.

1290. Q. What is the position of the cannoneers when mounted? A. The gunner and Nos. 3 and 4 on the limber-chest of the piece, gunner on the right and 3 on the left; 1, 2, and 5 on the limber-chest of the caisson—2 on the right and 1 on the left; 6, 7, and 8 on the middle chest of the caisson—6 on the right and 7 on the left.

1291. Q. If the instructor should command *Cannoneers mount*, instead of *Cannoneers prepare to mount, mount*, what will they do? A. Execute the movement the same as if *Prepare to mount* had been given.

1292. Q. What is the position of the cannoneers mounted when caissons do not accompany the pieces? A. The only change is that Nos. 1 and 2 are on the axle-seats—1 on the left and 2 on the right; 6, 7, and 5, on the off wheel, off swing, and off lead horses respectively.

1293. Q. Should the command *Action (right, left, or rear)* be given when the men are mounted on the chests, etc., what will they do? A. Immediately dismount and run to their posts.

1294. Q. Does the service of the 3.6-inch gun differ from the 3.2-inch gun? A. It is essentially the same; but to avoid fatigue to the men in handling it, Nos. 6 and 7 should be added to the detachment for its service.

1295. Q. Describe the posts of the cannoneers at a 3.6-inch gun limbered. A. Nos. 1 and 2 opposite the muzzle; 3 and 4 opposite the gun-axle; gunner and 5 opposite the middle of the flask; 6 and 7 opposite the limber-axle. All face to the front and

cover each other one yard outside the wheels, the gunner and even numbers on the right, and the odd numbers on the left. The caisson corporal, dismounted, is on the left of the caisson in line with the limber-axle; he faces in the direction the pole of the caisson points. Supernumerary cannoneers 8, 9, and 10, if present, are at the caisson, facing the same as the caisson corporal—8 on the right, opposite the corporal, and 9 and 10 are in line with the axle of the caisson body, covering the corporal and 8 respectively.

1296. Q. Describe the posts of the cannoneers at a 3.6-inch gun unlimbered. A. Gunner, same as 3.2-inch gun; No. 1 facing the piece, the right hip on a line with the front of the right wheel and 2 feet outside of it; 2 at the left wheel corresponding to No. 1; 3 same as 1 at the 3.2-inch gun; 4 same as 2 at the 3.2-inch gun; 5 same as 3 at the 3.2-inch gun; 6 same as 4 at the 3.2-inch gun; 7 same as 5 at the 3.2-inch gun. If each piece is accompanied by the caisson, the caisson corporal and 8, 9, and 10 take the posts prescribed for the piece limbered.

1297. Q. Of how many men is the detachment of a machine-gun composed? A. Ordinarily of two corporals and six cannoneers.

1298. Q. What are the commands for loading and firing a machine-gun? A. *Load, ready, commence firing*, given by the instructor, the gunner repeating the command, *Load*. If, instead of load, the instructor gives the command *Commence firing*, the gunner commands, *Load, ready, commence firing*.

1299. Which of the machine-gun detachment turns the crank, and how is the ammunition supplied? A. No. 1 turns the crank, and No. 2 receives from No. 4 or 6 the filled feed-case and inserts it in the hopper; he keeps his eye on the hopper to see that the cartridges are feeding properly, calls *Case* as the feed-case in the hopper is nearly empty; holds this case in his right hand, withdrawing the empty case with his left as soon as the last cartridge has passed, and at once inserts the filled feed-case; then passes the empty case over his left shoulder to No. 4 or 6.

1300. Q. How is a gun detachment marched to the park? A. In column of files or column of detachments. The column enters the park by the left if marching right in front—by the right if marching left in front. The column approaches the park parallel to its front and either in front or in rear of the pieces; the flank of the column being at such a distance from the poles, lead-horses, or muzzles that the detachments when formed in line near the pieces can be readily established in their proper positions by the gunners.

1301. Q. What are the commands for posting the gun detachments with their pieces? A. The instructor commands, *Detachments opposite your pieces*. If in column of files, as each detachment arrives opposite its piece, the gunner halts it and commands

(according as the right or left is in front), *Left* (or *right*) *face*; *Right dress*; *Front*. If in column of detachments, the gunner commands, *Detachment left* (or *right*); *March*; *Front*.

1302. Q. The gun detachments being at their pieces, give the commands for the different kinds of fire? A. To fire by piece, the captain commands, *Fire by piece*; *No. one* (*two, three, etc.*), *Fire*. To fire by platoon, the captain commands, *Fire by platoon*; *Right*, (*left* or *centre*) *platoon, Fire*. To fire by battery, the captain commands, *Fire by battery*; *Battery, Fire*.

1303. Q. In firing by piece, platoon, and battery, what command is repeated by the chiefs of platoons? A. The first command.

1304. Q. In the firing by platoon and piece, when do the chiefs of platoons designate their platoons and the pieces of same? A. As soon as the chiefs of platoon have repeated the first command.

1305. Q. When the last platoon or last piece of the battery is fired, what notification is given by the chief of this platoon, and what follows until the command *cease firing*? A. The chief of platoon will call out, *Round completed*; this will be repeated by the chief of the centre platoon, and will be notification to the chief of the right (or left) platoon to recommence the fire with his platoon or outer piece, as the case may be. The firing will be thus continued with the elevation, deflection, and length of fuse fixed by the captain until the command *cease firing* is given.

1306. Q. In ordinary fire, how many shots will be fired in two minutes? A. Six for a six-gun battery, or an interval of 20 seconds between successive shots. In slow fire, not less than 30 seconds.

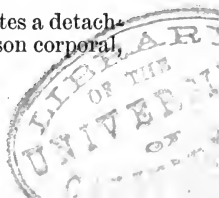
1307. Q. How is the rapidity of fire of a battery regulated? A. If a slower or more rapid rate of fire is required, the captain will caution *slow fire* or *rapid fire*; to resume the usual rate, he calls out *ordinary fire*.

1308. Q. Under what circumstances is the *fire at will* resorted to? A. It is used in action for short ranges only, and will not be used in instruction at drill for firing blank cartridges.

1309. Q. When ammunition is used what commands will the captain give before designating the kind of fire? A. *With blank cartridges*; or, *Range* (so many) *yards, with ball cartridges, load*.

1310. Q. How are the gun detachments marched from the park, and how formed for that purpose? A. They are marched in column of files or column of detachments. To form the column of files, the detachments being in front or rear, they are simply faced to the right. To form column of detachments, the instructor commands, *Detachments right* (or *left*), *March*; *Close, March*; *Guide right* (or left).

1311. Q. For purposes of instruction, what constitutes a detachment for mechanical manœuvres? A. Gunner, caisson corporal, and seven cannoneers.



1312. Q. When are mechanical manœuvres not to be executed? A. At drill when the carriages are horsed.

1313. Q. Give the command for changing wheels? A. *Prepare to change right (or left) wheel; change wheel.*

1314. Q. Describe briefly the duties of the different men in changing wheel? A. Nos. 1 and 2 remove the linch-pin and washer of the disabled wheel; 5, 6, and 7 dismount the spare wheel, and No. 5 runs it near and parallel to the disabled wheel, leaving room for it to be taken off; No. 2 steadies the spare wheel, while 1 and 5 take off the disabled wheel, which No. 5 runs to the rear; 1 and 2 put on the spare wheel, the caisson corporal and 3, 4, 6, and 7 using the spare pole to raise the axle; 1 and 2 replace the linch-pin and washer; 5, 6, and 7 place the disabled wheel on the spare wheel axle, and the caisson corporal and 7 replace the spare pole.

1315. Q. Give commands for dismounting a piece. A. *Prepare to dismount piece; Dismount piece.*

1316. Q. Describe briefly how to mount piece? A. At the command *prepare to mount piece*, the gunner and No. 5 at the trail, assisted by 1, 2, 3, and 4 at the wheels place the carriage so that the breech may be opposite the front of the wheels and half way between them. The gunner, and Nos. 1, 2, 3, and 4 then adjust the rope as in dismounting piece and the caisson corporal inserts his handspike in the bore. At the command *Mount piece*, 1, 2, 3, and 4 at the wheels, run the carriage to the rear; the caisson corporal and 6 and 7 lift the muzzle, keeping the piece nearly horizontal, and follow the movement of the carriage to the rear. When the trunnions are over the beds the rope is loosened, and the trunnions will fall in place. The gunner and No. 5 give direction to the carriage.

1317. Q. How is a gun-carriage dismounted? A. The piece being dismounted, the gunner runs the elevating screw up or down, according as it is the double screw or lazy-tongs. The sides of the carriage are successively raised by means of the spare pole, and the wheels removed by Nos. 1 and 5; care is taken to lower the axle gently to the ground. If blocks are available, the gunner places them to receive the carriage.

1318. Q. In mounting or dismounting gun-carriage and limbers what may be used in place of the spare pole? A. A lifting-jack, if available.

#### THE SABRE AND PISTOL.

1319. Q. How is the sabre worn when on foot? A. It is habitually hooked up; if the sabre be drawn, the scabbard is hooked.

1320. Q. When is the hand said to be *en tierce*, and when *en quarte*? The hand is *en tierce* when it holds the gripe, back of the

hand up; *en quarte*, when it holds the gripe, back of the hand down.

1321. Q. What are the commands for taking intervals and how executed? A. After specifying the interval in yards, the instructor commands, *To the right (or left) take intervals, March; Halt; Left (or Right) Face*. At the command *March*, the leading file steps off, followed in succession by the others at the specified interval; the command *halt* is given when the last file has its interval.

1322. Q. What is the order in which the manual of the sabre is taught? A. In the following order: *Draw, present, carry, inspection, port, carry, and return sabre*.

1323. Q. In sabre exercises, how are the men armed? A. Only with the sabre.

1324. Q. Describe the movement of *port sabre* from *carry*. A. Place the right hand *en tierce*, in front of the right hip, at the height of the waist, thumb extended on the back of the gripe, third and fourth fingers by the side of the others, edge to the front, blade inclined to the left and front, point two feet higher than the hand.

1325. Q. What is the use of the *moulinets* in sabre exercise? A. To give suppleness to the wrist, which increases the dexterity and confidence of the men.

1326. Q. Why, in teaching the sabre exercise on foot, should special reference be had to its application when mounted? A. Because if they should be permitted to lean one side they would derange their seats on horseback, and they must be taught to direct the blade so as not to strike the head or haunches of the horse or knee of the rider.

1327. Q. How are all cuts, when not executed by motions, terminated? A. By a half-moulinet in bringing the sabre to the position of *guard*.

[For further sabre and pistol exercises, see questions from to .]

#### SCHOOL OF THE BATTERY, DISMOUNTED.

1328. Q. What does the School of the Battery, dismounted, include? A. That of the platoon, section, and gun detachment dismounted, and the manœuvres of two or more gun detachments dismounted.

1329. Q. What comprises a section, dismounted? A. All the men belonging to a single piece and its caisson, consisting of one sergeant, who is chief of section, two corporals, the cannoneers of the piece, and the drivers of the piece and caisson, together with such artificers, wagoners, spare-caisson drivers, and privates as may be assigned to it for convenience of administration.

1330. Q. How are the men assigned to sections? A. They are

attached permanently, and only transferred by order of the captain ; but they may be temporarily attached to sections not their own to equalize subdivisions at drill or other duty.

1331. Q. Of what does a platoon, dismounted, consist? A. Of two sections, dismounted.

1332. Q. Of what does a battery, dismounted, consist? A. Of two or three platoons, dismounted.

1333. Q. Who are the guides of a battery, platoon, section, and gun detachment? A. Of a battery, the chief of section and caisson corporal, posted on its right and left ; those of a platoon or section, the non-commissioned officers posted on its right and left ; those of a gun detachment, the gunner and the front-rank man on the opposite flank.

1334. Q. By whom is a caisson corporal, guide of a battery, platoon, or section covered in the rear rank? A. He is not covered.

1335. Q. What commands do chiefs of platoons and sections repeat? A. They repeat or give commands only when prescribed ; in movements by section, the chiefs of platoons do not repeat or give commands.

1336. Q. Give the posts of officers, non-commissioned officers, etc., of a battery formed in line, dismounted? A. The captain is four yards in front of the centre ; the senior lieutenant is with the right platoon ; the next in rank is with the left platoon, and the fourth in rank with the centre platoon, each two yards in front of the centre of his platoon ; the lieutenant who is third in rank is chief of caissons, four yards in rear of the centre of the battery ; the first sergeant is on the right of the battery, aligned on the front rank and one yard from it ; the quartermaster and stable sergeants are in one rank, on the left of the battery, aligned on the front rank and one yard from it, the quartermaster sergeant on the right ; each chief of section is on the right of the front rank of his section ; each gunner is one yard in rear of the right file of his section ; each caisson corporal is on the left of the front rank of his section ; the guidon is the left file of the front rank of the third section ; but if there be but two platoons, he is the left file of the front rank of the second section ; the trumpeters are in one rank on the right of the first sergeant and two yards from him.

1337. Q. What is the position of the senior lieutenant of a battery, dismounted, in column of files? A. He is at the side of the leading guide.

1338. Q. By whom are the chiefs of platoons and chiefs of sections replaced when absent? A. By the first sergeant, quartermaster sergeant, and other sergeants in the order of rank, except that the first sergeant, if performing the duty of an officer, the quartermaster sergeant and stable sergeant are not replaced. Gunners replace absent chiefs of sections, caisson cor-

porals absent gunners, and privates selected for efficiency absent caisson corporals.

1339. Q. Describe as briefly as possible the formation of a battery, dismounted, at the sounding of the "assembly"? A. The first sergeant places himself six yards in front of where the battery is to form, and commands, *Fall in; Left face; Call rolls; Report*. At the command *Fall in* the chiefs of sections place themselves on the line facing to the right, at sufficient distance apart for the formation of their sections, the men of each section fall in, facing to the right, the front-rank men covering their chief; the signal having ceased, the first sergeant causes the sections to close up or give way if necessary; the men are then faced to the left, and the chiefs of sections step out two yards in front of centre of sections, face toward them, call rolls, resume their places in ranks, and at the command *Report* salute the first sergeant and report in succession from right to left; first sergeant faces about, salutes the captain or battery officer of the day, reports the result of the roll-call, and takes his post in line. The chiefs of platoons and chief of caissons take post immediately after the first sergeant has taken his place.

1340. Q. When should sabres be drawn by the officers? A. During instruction the officers have the sabre drawn, or in the scabbard, at the discretion of the captain. When the captain draws sabre the chiefs of platoons and chief of caissons will also draw theirs. The captain will himself draw sabre before he orders the battery to draw sabre.

1341. Q. In drawing or returning sabre at close order, what is required of the rear-rank men? A. They march backward two yards at the command *Draw* or *Return*, closing to its proper distance on the completion of the movement. The sabres are not drawn until the ranks are opened, whenever that movement is to be executed before moving off.

1342. Q. How is the battery, dismounted, dismissed? A. If sabres be drawn, the captain commands *Return sabre*, and then directs the first sergeant, *Dismiss the battery*. The officers fall out and the first sergeant commands, *Dismissed*.

1343. Q. How is the *march in short step, mark time, change step, side step, march backward, oblique in line, passing from quick to double time and the reverse*, executed? A. As explained in the School of the Soldier, dismounted, substituting *battery* for *squad*. In the oblique march the ranks remain parallel to their former position. In marching in double time the left hand, instead of being raised, steadies the scabbard; the sabre, if drawn, is held in a vertical position in the right hand, forearm horizontal and swinging naturally.

1344. Q. If the battery, dismounted, is marching, and the instructor wishes to march the battery to the rear and exercise it in that position, what command must he give after the battery has

faced to the rear, and what is done? A. He commands, *File-closers to the rear, March*, at which the chiefs of platoons hasten to the front and the file-closers to the rear of their subdivisions, the chiefs of the right and left platoons passing around the outer flanks of their platoons; the chief of the centre platoon through the interval of the two sections of his platoon, after the file-closers, who use this same interval. The file-closers pass by the nearest flank of their sections. Each chief of section, except the one on the flank of the battery, falls back into the line of file-closers, and resumes his place in line when the change is effected.

1345. Q. Being in line at a halt or marching, give commands for turning and advancing. A. *Battery right (or left) turn; or, Battery right (or left), half-turn, march; Forward, march; Guide right (or left).*

1346. Q. If the march in column of files is made in double time, what is the distance between files? A. Thirty-six inches; this distance may also be taken while marching in quick time, if necessary, by the captain commanding *Fall back*.

1347. Q. By what method is increased distance gained while marching in column of files? A. If marching, all the files except the first shorten step and resume the full step when each has thirty-six inches from the file in front. If halted, the rear files remain halted until the file in front has gained the distance.

1348. Q. If the column of files be halted while marching with increased distance, what is done? A. The leading file halts, and the others close up to facing distance and then halt.

1349. Q. If the column of files at increased distance be marched by the flank, how is it executed? A. The men close in gradually at the command for the guide, and take the proper interval from his side.

1350. Q. If in line at a halt, and the captain gives a command to form subdivisions, what is done at the first command? A. Each chief of subdivision, if not already there, steps briskly in front of his subdivision, faces it, and cautions, *Platoon (or section) right*.

1351. Q. Who replaces each chief of section when he leaves his place on the flank? A. The gunner.

1352. Q. If in line at a halt, and the captain desires to form subdivisions and move forward without halting, what are the commands? A. *Platoons (or sections) right (or left) turn, march; Forward, march; Guide (right or left).*

1353. Q. In obliquing in column of subdivisions, who are the guides? A. The guide of each subdivision on the side toward which the oblique is made is the guide of the subdivision; the guide of the leading subdivision is the guide of the column.

1354. Q. If the column resumes the direct march from an oblique, where is the guide? A. It is, without indication, on the side it was previous to the oblique; but if the oblique be



executed from a halt, the guide is announced upon taking the direct march.

1355. Q. How may the column of subdivisions be put in march and change direction at the same time? A. The captain commands, *Forward, column right (or left), march; Guide right (or left)*. The leading subdivision executes the *turn and advance*; the other subdivisions move forward and turn on the same ground as the first; the guide is announced when the leading subdivision has changed direction.

1356. Q. If marching in column of subdivisions and the commands are to march by the flank, what does each chief of subdivision do? A. He places himself by the side of the non-commissioned officer at the head of his subdivision, dresses on the chief who conducts the subdivision on the side of the guide, and preserves the proper interval.

1357. Q. If marching in column of subdivisions and the captain wishes to form column of files, what is the command? A. *By the right (or left) flank; Platoons (or sections) column left (or right); march*.

1358. Q. When line is formed, to the right or left from column of platoons, when does each chief of platoon face about? A. At the command *Front* of the captain.

1359. Q. When line is formed to the right or left from column of sections, what is done by the various chiefs at the command front of the captain? A. Each chief of platoon takes his place in line and each chief of section and gunner takes his post on the flank of his section and in the line of file-closers.

1360. Q. Give commands and describe how to form line to the front from column of subdivisions from a halt. A. The captain commands, *Right (or left) front into line; march; Front*. At the first command the chief of the leading subdivision commands, *Forward, guide left*; the other chiefs command *Right oblique*. At the command *march*, repeated by all the chiefs, the leading subdivision advances nineteen yards, when its chief commands, *Platoon (or section), halt; Left dress*. The other subdivisions oblique to the right until opposite their places in line, when their chiefs command, *Forward, march; Guide left*, adding, as they arrive near the line, *Platoon (or section), halt; Left dress*. The captain superintends the alignment from the left flank, and commands *front* on its completion.

#### EXERCISES OF TWO OR MORE GUN DETACHMENTS.

1361. Q. What are the exercises of two or more gun detachments similar to, and what is substituted in the words of command? A. They are similar to those of a battery or platoon, dismounted, the words *detachment* and *detachments* being substituted for the designation of one or more subdivisions.

1362. Q. When chiefs of sections are present during the exercise of gun detachments, where do they take post and what commands do they give? A. They take post in line on the right of the front rank, the gunners stepping back one yard in rear of the right file of their detachments. In column of detachments, the chiefs of sections are on the side of the guide one yard from the front rank; in column of files, they are as if they had faced with the detachment in line. The chiefs of sections do not repeat or give commands.

1363. Q. In what way do gunners command their detachments? A. Without leaving their places on the right. When a detachment is aligned to left at the command of the gunner, the men dress on the left file of the front rank.

1364. Q. Who are the guides of a detachment? A. The gunner and the front-rank man of the file on the opposite flank.

#### SCHOOL OF THE SOLDIER, MOUNTED.

1365. Q. What is the object of the School of the Soldier, mounted? A. The instruction of the recruits in horsemanship as regards giving them confidence, a correct carriage, and a firm well-balanced seat, as well as to teach them to control the movements and paces of the horse.

1366. Q. What men should be instructed in this school? A. All the cannoneers of field batteries as well as those of horse artillery, and it is an indispensable preparation for the duties of a non-commissioned officer as well as for those of a driver.

1367. Q. What general rule governs the gait of the horse in all mounted instruction? A. The rule that all mounted instruction should begin and end at a walk.

1368. Q. Enumerate some of the rules which should be impressed upon recruits as regards the care of a horse? A. Never threaten, strike, or abuse a horse; before entering a stall speak to him gently, and then go in quietly; never put him up in the stable or at the line heated without throwing a blanket over him, or walk him until he is cool; never feed him grain when heated; never water a horse when heated, unless the exercise or march is to be continued; never allow his back to be cooled suddenly by washing or removing the blanket unnecessarily, etc.

1369. Q. Into how many thicknesses should the saddle-blanket be folded? A. Six.

1370. Q. Describe the principal points to be observed in placing a saddle-blanket on a horse? A. The blanket should be placed from the left side, well forward on his back; the blanket should be slid once or twice from front to rear to smooth down the hair, and never under any circumstances should it be drawn forward against the lay of the hair; remove the locks of the mane that

may lie under the blanket ; the sureingle should be buckled on the near side, a little below the edge of the blanket.

1371. Q. Describe the position of *stand to horse*. A. Each recruit places himself face to the front on the near side of the horse, his eyes on a line with the front of the horse's head, and takes the position of the soldier dismounted, except that his right hand, nails down, is well up and grasps both reins, the forefinger separating them six inches from the bit.

1372. Q. What interval is taken between horses when led out ? A. Three yards.

1373. Q. What part of the body of a man mounted should be movable and which immovable? A. The body from the hips up and from the knees down should be movable ; from the hips to the knees should be immovable and close to the horse. The arms move freely at the shoulders to avoid communicating the motion of the body to the reins ; the hands oscillate slightly with the motion of the horse, but otherwise they are stationary.

1374. Q. By what commands may men be dismounted from the off side of their horses ? A. *To the right, prepare to dismount; dismount.*

1375. Q. What are men permitted to do when the command *rest* is given while mounted? A. They are permitted to turn their heads, to talk, and to make slight changes of position ; but they must not lounge on their horses.

1376. Q. How many mounted exercises are prescribed for artillery instruction ? A. Seventeen.

1377. Q. How is a horse governed by the use of a rider's legs ? A. The legs serve to urge a horse forward, to support him and guide him ; when closed without pressure they tend to steady the horse in his position ; when both legs are closed equally, pressing the horse, they tend to moving him forward ; when closed, the right more to the rear than the left, they tend to turn him to the right, and the same movement with the left leg tends to turn him to the left.

1378. Q. What is meant by *gathering the horse* ? A. It means that by closing both legs lightly and raising the hands gently until the horse feels the bit, it prepares the horse for whatever movement is to follow.

1379. Q. What is meant by *opening the right rein* ? A. It means that less pressure is brought upon the right of the bit than the left.

1380. Q. How is the horse *wheeled to the right (or left)* ? A. Open the right (or left) rein and close the right (or left) leg, pressing slightly with the left (or right) knee, the right (or left) leg more to the rear than the other.

1381. Q. In making an *about* mounted, how is the movement executed ? A. Each recruit describes a half-circle whose radius is two yards, and then moves off in the new direction.

1382. Q. In making an *oblique*, mounted, how is the movement executed? A. Each recruit makes a half-wheel to the right, describing the eighth of a circle whose radius is two yards, and then moves off in the new direction.

1383. Q. Give commands and describe movement for *rein back*. A. Being at a halt, the command *backward, march, squad, halt* is given. At the command *backward*, the horse is gathered; at the command *march* keep a firm seat, holding both legs close; rein in gradually until the horse yields to the pressure of the bit and steps to the rear; then immediately yield the hand slightly to allow the horse to regain his balance and relax the legs; continue in the same manner to yield the hand and relax the legs and rein in and close the legs so as to keep the horse in continuous motion.

1384. Q. Give commands, and describe how to mount in line (horse unsaddled)? A. The instructor causes the men to call off from right to left, and commands *Prepare to mount; mount; form rank*. At the first command the odd numbers, stepping off with the left foot, lead their horses four yards to the front, keeping opposite their intervals and regulating by the right. All then prepare to mount; at the second command they mount, and at the last command the even numbers move up in the intervals and form rank.

1385. Q. In dismounting in line (horses unsaddled), which of the numbers move forward? A. The odd numbers.

1386. Q. Being at a walk, mounted, how is the horse made to trot? A. By first gathering the horse, then lowering the hands a little and closing the legs by degrees until the horse obeys, when the hands are gradually replaced and the legs relaxed.

1387. Q. What is the difference between a *canter* and a *gallop*? A. The canter is a short collected gallop, at the rate of about 8 miles an hour, while the gallop proper is a freer movement of the canter, increasing the gait to 12 miles an hour.

1388. Q. Being at a trot, mounted, how is the horse made to canter? A. First gather the horse, close both legs, and rein in with a light, firm hand to bring his haunches under him; then carry the bridle hand to the left and increase the pressure of the left leg, in order to throw the weight on the near hind leg, and allow the off, fore and hind legs to lead; as soon as the horse rises give the hand and relax the left leg; rein in slightly and close the legs with a light even pressure, to keep the horse at the gait and up to the hand. If the horse leans on the hand, yield it and play the reins slightly; then close the legs and rein in a little abruptly; when the horse obeys, yield the hand.

1389. Q. What is the object of the turns on the forehand and haunches and the passage? A. It is to teach the horse to be obedient to the pressure of the legs and reins, and to instruct the recruits in the application of the aids.

1390. Q. Mention some of the other exercises, not already enumerated, by which the men and horses may be perfected in movements? A. The standing and flying jump, ditch-jumping, leaping the bar dismounted with the horse, wrestling mounted, the pursuit, and running at heads.

1391. Q. Describe *Draw sabre*. A. At the command *draw* reach with the right hand over the bridle-hand and pass it through the sabre-knot; seize the gripe and draw the blade six inches out of the scabbard. At the command *sabre* draw the sabre quickly, raising the arm to its full extent at an angle of about 45 degrees, the sabre edge down in a straight line with the arm; make a slight pause, bring the back of the blade against the hollow of the shoulder, the wrist resting on the top of the thigh, forearm against the body, the little finger on the outside of the gripe.

1392. Q. What is the command for taking intervals for sabre exercise mounted? A. Being in line at a halt, the commands are, *To the right (or left) take intervals, march; by the left (or right) flank, march; squad, halt; right (or left) dress; front*.

1393. Q. What difference exists in the sabre exercise mounted and that dismounted? A. Mounted it is the same as dismounted, except that at the command *guard* the men move the right hand and sabre only.

#### HORSE ARTILLERY.

1394. Q. What does the special instruction require for the cannoneers of a battery of horse artillery embrace? A. That of a gun detachment mounted, and that of two or more gun detachments mounted.

1395. Q. How are the men of a horse battery equipped, and with what are they armed? A. They have spurs and belts, and in garrison may be armed with the sabre, at the discretion of the instructor.

1396. Q. How is a gun detachment, mounted, formed? A. In two ranks, boot to boot, with the distance of one yard from the croups of the front-rank horses to the heads of the rear-rank horses. The gunner and even numbers are in the front rank and the odd numbers in the rear rank, the gunner being covered on the right by No. 1. No. 2 is on the left of the gunner, who is covered by No. 3.

1397. Q. What does a gun detachment, mounted, include besides the cannoneers for the service of the gun? A. Two additional men, Nos. 6 and 7, who are required as horse-holders for the cannoneers' horses. When projectiles are fired, another man, No. 8, is required in each platoon to hold the horses of the chief of platoon and the chiefs of sections; he is assigned to the right gun detachment of the platoon, as a rule.

1398. Q. How is the alignment to the rear of a gun detachment, mounted, effected? A. The instructor causes two files from either flank to rein back a few yards, aligns them parallel to the line and opposite their places, and commands, *Right (or left) backward, dress; Front*. At the command dress the cannoneers rein back, keeping their horses straight, pass a little to the rear of the line, and dress up to the men who have been established.

1399. Q. Explain how a right oblique is made with a gun detachment, mounted? A. At the command, *Right oblique, march*, the cannoneers open out slightly and each man makes a half-wheel to the right, so that the head of his horse may be opposite the shoulders of the horse on his right; each rear-rank man follows the second man on the right of his front-rank man, the two cannoneers nearest the flank toward which the oblique is made maintaining the same degree of obliquity as the front rank; all the cannoneers then move off in the new direction, regulating themselves upon the guide, which is, without indication on the side toward which the oblique is made.

1400. Q. When is the guide announced if the oblique of a gun detachment, mounted, is made from a halt? A. On taking the direct march.

1401. Q. In making a right wheel from a halt with a gun detachment, mounted, on what kind of a pivot is the wheel made, and how is it executed by the pivot-man? A. It is made on a movable pivot—the pivot-man moving over a quarter-circle whose radius is two yards; upon completing the wheel he moves off at right angles to the original direction.

1402. Q. How is the *about* executed by a gun detachment, mounted? A. It is executed the same as the wheel, except that the leading pivot-man describes a half-circle whose radius is two yards, and then moves off in the new direction.

1403. Q. What must be done in making an *about* by a gun detachment, mounted, as soon as the front-rank man on the marching flank has completed the about? A. The guide must be announced or the detachment halted.

1404. Q. If a gun detachment, mounted, be marching, and the command is given, *By file, by the right flank, march*, how is it executed? A. The men on the flank toward which the movement is to be made execute the wheel at the command *March*; the others halt and then wheel in succession.

1405. Q. When the gun detachment, mounted, is in column of files, marching, how should each cannoneer conduct his horse? A. So that the man of his rank who immediately precedes him may hide all the other men in his front.

1406. Q. What is the command for forming line to the right or left from column of files? A. *Left (or right) into line, march; Detachment halt; Right (or left) dress; Front*.

1407. Q. How is a line formed to the front from a column of files from a halt or at a walk? A. At the command, *Right front into line*, the rear-rank men slacken their gait until each is abreast the file in rear of his proper front-rank file. At the command *March*, the front rank executes right front into line, the rear-rank men oblique to the right, each man moving forward so as to come up behind his file-leader.

1408. Q. Describe the posts of the gun detachment, mounted, at the piece, limbered. A. In rear the detachment is in line, facing to the front, its centre opposite the muzzle and the head of the front-rank centre horse two yards from it. In front, the detachment is in line facing to the front, the centre opposite the pole and the croups of the centre horses in the rear rank, two yards from the heads of the lead-horses.

1409. Q. Describe how to change post at a halt from rear to front of the mounted detachment at the piece limbered. A. The instructor commands, *Detachment front, march*. The gunner commands *Right oblique* at the first command and repeats the command *March*. As soon as the piece is unmasked he commands, *Forward, march*; when the detachment has advanced far enough he adds: *Left oblique, march*; *Forward, march*; *Detachment, halt*; *Left dress*; *Front*.

1410. Q. In moving the mounted gun detachment at a halt from front to rear at the piece limbered, what are the commands of the gunner? A. At the first command of the instructor the gunner from his place in ranks commands, *Detachment left about*, and repeats the command *March*. When the detachment has passed the muzzle, he commands: *Detachment left about, March*; *Detachment halt*; *Left dress*; *Front*.

#### SCHOOL OF THE DRIVER.

1411. Q. How many horses has a driver the care of, what are they called, and which does he mount? A. He has the care of two horses, called a *pair*; the one he mounts is called the *near horse*, the other the *off horse*.

1412. Q. How many harness-pegs are arranged for each pair of horses, and how are they used? A. Three pegs to each pair; the upper peg holds the pole-yoke with martingales attached, bridles and collars of the near and off horses. The middle peg holds the off harness and the saddle with its attachments over the seat. The leg-guard is slipped over the lower peg, and the near-harness is placed on it; each hair-pad is placed on top of its saddle.

1413. Q. Where is the harness placed when taken from the horses in the field? A. The pole-prop is placed under the end of the pole; the single-trees are left attached to the double-trees; the wheel-traces are unhitched from the collars only and laid over the chest from front to rear or on the footboard; the collars

of the wheel-team on top of the limber-chest, and the remainder of the harness is placed on the pole, except the neck-yoke, which is placed on the footboard.

1414. Q. When it is intended to lead out, what does the driver do as soon as each swing and lead pair has been harnessed? A. He turns his pair about at the line or in a double stall, so that they can move off promptly, and then stands to horse.

1415. Q. To what part of the harness is the coupling-rein attached? A. To the off ring of the off horse's bit, and passes through the near ring.

1416. Q. How is the off horse managed when in harness? A. By the coupling-rein, the whip, and the bridle-reins.

1417. Q. How are the reins used for the off horse in harness? A. Whenever the driver has occasion to use the coupling-rein he takes hold of it, in front of the left hand, in the manner prescribed for the right rein of the watering-bridle; to use the bridle-reins of the off horse he takes hold of the lash, or that part of the reins in rear of the collar in the same manner.

1418. Q. What are the bridle-reins of the off horse auxiliary to, and for what purposes will they be used? A. They are auxiliary to the coupling-rein, and they will be used for halting the off horse and moderating his gait whenever the driver does not need the coupling-rein to control the movements of the horse. In applying them the right hand is drawn toward the thigh, as by means of the collar an equal tension is transmitted to each rein.

1419. Q. What is the general rule for drivers to gather their horses when in harness? A. In simultaneous movements all gather their horses at the preparatory command; in successive movements the men who are to move at the command of execution gather their horses at the preparatory command; the others just before they begin the movement.

1420. Q. In marching from line by the flank with intervals, what does each driver do? A. He wheels his pair to the right by moving the pivot-horse over a quarter-circle whose radius is three and one quarter yards; the other horse quickens his movements to keep in line with the pivot-horse. On the completion of the wheel, he moves off his pair at right angles to the original direction.

1421. Q. In marching to the rear, what does each driver do? A. Instead of wheeling, he makes his pivot-horse describe a half circle whose radius is  $3\frac{1}{4}$  yards.

1422. Q. In marching to the right or left oblique, what part of a circle is described? A. The eighth of a circle whose radius is  $3\frac{1}{4}$  yards.

1423. Q. To leave the stable or picket-line and form the team in line of pairs, who leads and how is the line formed? A. The lead-driver begins the movement, and is followed by the swing



and wheel-drivers. The team is formed in line with intervals of two feet between the pairs, the lead-horses on the right, the wheel-horses on the left.

1424. Q. When horses have been led out by teams, describe how they may be connected for being posted with their carriages? A. After they are coupled they may be connected by the traces. For this purpose the instructor commands, *Hook traces*. The swing-driver goes behind his off horse, passing by his off side, untrusses and hooks the rear ends of the swing-traces to the front ends of the corresponding wheel-traces, beginning with the outer trace of the off horse and ending with the outer trace of the near horse. Each lead-driver conforms to what has just been prescribed for the swing-driver, beginning with the outer trace of his off horse as soon as the swing-driver has hooked the corresponding trace of his pair.

1425. Q. In disconnecting the pairs of a team, which traces are first unhooked? A. The outer traces of the near horses.

1426. Q. How must a column of teams enter the park? A. If right in front, it enters at its left; if left in front it enters at its right.

1427. Q. When a connected team has been ordered to be hitched, by whom is it hitched to the carriage? A. By the cannoneers.

1428. Q. When a disconnected team is ordered to be hitched, what is done? A. The instructor dismounts the drivers and commands, *Drivers hitch*.

1429. Q. When the command *Unhitch* is given, who unhitches the team? A. The cannoneers.

1430. Q. When it is desired to disconnect the pairs and unhitch at the same time, what command is given? A. *Drivers, unhitch*.

1431. Q. When a team is hitched to a carriage and a preparatory command is given for a movement of the animals, what is the general rule regarding the traces? A. Before a team (hitched), moves, the traces must always be stretched by a slight movement of the horses forward.

1432. Q. When the team is halted, on the execution of a movement, are the traces to remain slack? A. No; the traces are stretched as soon as the carriage stops, by moving the horses a step or two forward.

1433. Q. How are the *rests* executed with a team hitched? A. They are executed as prescribed in the School of the Driver, except that the drivers, when dismounted, need not hold the reins, but must remain on the left of their horses and close to them.

1434. Q. In all changes of direction under whose control is the movement of the carriage, and what caution must be preserved by the drivers? A. The carriage is under the control of the wheel-driver, who is responsible for the correct execution of the movement. The lead and swing drivers keep their traces stretched, and aid in the draft as much as possible; but they must be careful

to avoid the tension that would pull the wheel-pair out of its proper direction.

1435. Q. In making an about, with a team hitched, what difference is made in the radius of the circle as described for a team unhitched. A. There is no difference except when the movement is made at a trot or gallop, in which case the radius is somewhat increased.

1436. Q. How is the *reverse* executed with the team hitched? A. The drivers oblique to the right; the lead-driver after gaining  $7\frac{1}{2}$  yards in that direction, moves his horses towards the left, so that the extreme part of the curve described by the off horse will be 15 yards from the line of departure and that, after passing three yards to the left of the original left flank of the team and carriage, they will return to the ground occupied by the carriage at the beginning of the movement. The swing-driver follows the lead-driver; the wheel-driver directs his horses so that the right limber-wheel describes a loop which, extending  $7\frac{1}{2}$  yards to the right and 12 yards to the front of the line of departure, passes a little to the left of the original left flank and then returns, bringing the hind wheels in such a position that the rear of the carriage occupies the line of departure.

1437. Q. How is a carriage moved a short distance to the rear? A. From a halt, the command is given, *Backward, march*; at which the drivers rein back their horses, keeping the pole straight, and when the command *halt* is given they stretch the traces and halt.

1438. Q. How is a carriage backed to the right or left? A. From a halt, the command is given, *Right (or left) backward, march*; at the first command the drivers swing the team to the right, without advancing or backing the carriage until the limber wheel comes against the wheel-guard plate; at the command *march*, they rein the horses back, taking care to keep them to the right; when the command *halt* is given they straighten the team and carriage, stretch the traces and halt.

#### EXERCISE OF A SECTION.

1439. Q. What constitutes a *section* of a battery? A. A piece and its caisson.

1440. Q. Describe the positions occupied by the non-commissioned officers with a section hitched and the position of the carriages? A. The carriages are placed in column with two yards, distance between the rear part of the leading carriage and the heads of the lead-horses of the carriage which follows. The chief of section takes post boot to boot with the lead-driver of the leading carriage, and on his left; the caisson corporal, if horsed, is with the caisson and boot to boot with its lead or swing-driver, according as the piece or caisson is in front. The chief of section is the guide

of the section ; the guide of the carriage is the non-commissioned officer boot to boot with its lead-driver ; the lead-driver is the guide of a carriage temporarily without a non-commissioned officer.

1441. Q. At the command, *Caisson pass piece, march*, while at a halt, what is done ? A. The piece stands fast ; the caisson inclines to the right, passes the piece, takes its place in front by inclining to the left, and moves forward ; the piece then follows in the track of the caisson at two yards' distance. The chief of section moves forward and joins the lead-driver of the caisson as he passes ; the caisson corporal, during the passage is boot to boot with the lead-driver ; upon passing the lead-horses of the piece, he falls back and moves boot to boot with his swing-driver.

1442. Q. How is the gait of the leading piece governed in the passage of carriages ? A. If at a walk, the piece halts at the command *March* ; if at a trot or at a walk and the command be *trot*, the piece moves at a walk until the caisson passes, and then takes up the *trot* ; if at a gallop or trot, the same principle applies, the piece moving at a trot.

1443. Q. Upon the completion of the about and the reverse with a section, hitched, what is required of the chief of section and the caisson corporal ? A. The chief of section moves forward and places himself beside the lead-driver of the leading carriage ; the caisson corporal falls back with the swing-driver ; or moves forward beside the lead-driver of the caisson, according as the piece or caisson was in front at the beginning of the movement.

1444. Q. What is a *countermarch* ? A. It is a movement to place a piece and its caisson in the same relative position on the ground they occupied before, but facing in the opposite direction.

#### SCHOOL OF THE BATTERY.

1445. Q. Of what does a *section* and *platoon* and *battery* consist ? A. A section consists of a piece of light artillery and its caisson manned, horsed, and equipped ; a platoon consists of two sections ; a battery of manœuvres consists of two or three platoons, either with or without caissons ; in a battery of machine guns the number of platoons may be increased to four or five.

1446. Q. What is the *front* of a battery ? A. In the order in battery it is the line occupied by its pieces ; in the other formations, it is the line occupied by the lead-drivers of the front-rank carriages.

1447. Q. What does the *personnel* of a battery of manœuvre comprise ? A. One captain, who commands the battery ; four lieutenants, three who are chiefs of platoons and one who is chief of caissons ; one first sergeant, who reports all emergencies to the captain and acts as his assistant ; one quartermaster sergeant, whose duty it is to supply the battery and care for its *matériel* ; one stable and veterinary sergeant, whose duties in camp

and garrison are connected with the picket line and stables and the care of sick horses, and on the march and in action with the reserve of the battery ; six sergeants, who are chiefs of sections ; six gun detachments, each composed of seven men (two corporals and five privates), and in horse and heavy field batteries each detachment is composed of two corporals and seven privates ; one driver to each pair of horses ; two trumpeters, and one guidon, who ordinarily indicates the position of the guide.

1448. Q. What non-commissioned officers are not a component part of the battery of manœuvre ? A. The quartermaster sergeant and the stable sergeant ; they have, however, positions assigned them for inspections and reviews.

1449. Q. How are the enlisted men of a battery armed in the field ? A. The first sergeant, quartermaster sergeant, stable sergeant, and chiefs of sections are armed with the sabre and revolver ; all other men are armed with the revolver and knife.

#### FORMATIONS OF THE BATTERY.

1450. Q. What are the habitual formations of a battery ? A. The *order in line*, *order in column*, and the *order in battery*.

1451. Q. What is the *order in line* of a battery ? A. That in which the carriages are formed in one or two ranks, the horses all facing in the same direction ; the pieces limbered and in one rank, and each preceded or followed by its caisson when caissons are present.

1452. Q. What is the *order in column* of a battery ? A. That in which the battery is formed in column of platoons or in column of sections, the pieces being limbered and each followed or preceded by its caisson when caissons are present.

1453. Q. What is the *order in battery* of a battery ? A. That in which the pieces are prepared for firing, the pieces and limbers being formed in two parallel lines ; if the caissons are present they form a third line in rear of and parallel to the limbers. The pieces are turned toward the enemy ; the limbers and caissons, unless otherwise directed, face to the front.

1454. Q. What are the intervals between carriages ? A. In column of platoons, in line, and in battery the interval between carriages is fifteen yards ; in horse batteries, nineteen yards. In column or in line, the distance between two carriages, or between a carriage and mounted detachment, is two yards ; in battery, the distance between the lines of limbers and pieces is ten yards, measured from the end of the handspike to the heads of the lead-horses or to the backs of the limbers, according as the limbers are faced to the front or rear ; between the lines of limbers and caissons the distance is eleven yards.

1455. Q. In what cases are intervals between carriages diminished, and how much ? A. When carriages have but one or two

pairs of horses ; with one pair the distance is diminished six yards ; with two pair, three yards.

1456. Q. Describe the posts of officers of a battery in the order in line. A. The captain is in front of the centre of the battery, four yards from the line of the heads of the lead-horses ; each chief of platoon is half-way between the leading carriages of his platoon and in line with the lead-drivers.

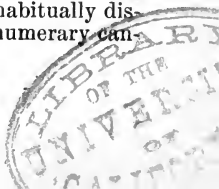
1457. Q. Describe the posts of the non-commissioned officers and musicians of a battery in the order in line ? A. The chief of caissons is in rear of the centre of the battery, the head of his horse four yards from the line of the rear of the rear-rank carriages ; the first sergeant is half-way between the central sections, in line with the limber wheels of the pieces ; the quartermaster sergeant is four yards from the left flank of the battery, aligned on the lead-drivers of the front-rank carriages ; the stable sergeant is on the left of the quartermaster sergeant and boot to boot with him ; each chief of section is boot to boot with the lead-driver of his section and on his left ; each caisson corporal is on the left and boot to boot with the lead or swing-driver of the caisson, according as the pieces or caissons are in front ; the guidon is four yards from the right flank of the battery, aligned on the lead-drivers of the front-rank carriages at inspections and reviews and before leaving the park, but on other occasions he is boot to boot with the right or left guide of the battery, and on his left ; the trumpeters at inspections and reviews are in line on the right of the guidon, each feeling the boot of the man on his left ; on other occasions they have the same positions as in column.

1458. Q. Describe the positions of the cannoneers of a battery in the order in line ? A. They are at their posts or mounted on the chests. In horse batteries they are in the ranks of the mounted detachments, two yards in rear of their pieces, whether the pieces or caissons lead.

1459. Q. Give the posts of the officers of a battery in the order in battery ? A. The captain is on the left of the chief of the centre platoon, but goes wherever his presence is necessary ; each chief of platoon is habitually in the centre of his platoon, half-way between the lines of pieces and limbers.

1460. Q. Give the posts of the horse-holders in a horse battery in the order in battery ? A. The horse-holders, with the horses of the detachment, are either two yards in rear of the limbers or two yards in front of the lead-horses of the limbers, according as the limbers face to the front or rear ; in either case the horse-holders face to the front.

1461. Q. What do the chiefs of platoons and sections do with their horses when projectiles are fired ? A. They habitually dismount and give the reins of their horses to a supernumerary cannoneer of the platoon.



1462. Q. To whom do the chiefs of platoons and sections give their horses when there is no spare cannoneer for the purpose? A. The chief of platoon gives the reins of his horse to the swing-driver of his right-limber, if the limbers are facing the front, or to the swing-driver of his left limber if the limber is facing to the rear; the chiefs of sections give the reins of their horses to the wheel-drivers of their limbers.

1463. Q. When does the caisson corporal dismount in the order in battery, and what does he do with his horse? A. He dismounts when ammunition is served from a caisson, and gives the reins of his horse to the wheel driver.

1464. Q. What is the *depth and front* of a field, as well as horse battery, of three platoons in order in battery? A. Field battery, 53 yards depth, 87 yards front; horse battery, 53 yards depth, 107 yards front.

1465. Q. When preparatory signals are given with the sabre, what is the signal of execution? A. The *return to guard* from the preparatory signal.

1466. Q. What is the preparatory signal with the sabre for *Forward*? A. The first and second motions of *front cut*; the captain moves his horse forward.

1467. Q. What is the preparatory signal with sabre for *Right and left oblique*? A. Extend the arm and sabre *obliquely* to the right (or left) until both are horizontal.

1468. Q. What is the preparatory signal with sabre for *By the right (or left) flank*? A. Extend the arm and sabre directly to the right (or left) until both are horizontal.

1469. Q. What is the preparatory signal with sabre *To increase the gait one degree*? A. Carry the hand to the right shoulder, blade vertical; raise and lower the hand, keeping the blade vertical; to be several times repeated.

1470. Q. What is the preparatory signal with sabre *To decrease the gait one degree*? A. The first motion of the head parry.

1471. Q. What is the preparatory signal with sabre for *Halt*? A. Raise the arm vertically to its full extent, the blade in prolongation of the arm.

1472. Q. What is the preparatory signal with sabre for *Platoons right (or left) wheel*? A. The first and second motions of right (or left) cut.

1473. Q. What is the preparatory signal with sabre for *Reverse*? A. Raise the arm vertically to its full extent, the blade in prolongation of the arm, and describe several horizontal circles with the point of the sabre.

1474. Q. What is the preparatory signal with sabre for *Right (or left) front into line*? A. The first and second motions of right (or left) moulinet.

1475. Q. What is the preparatory signal with sabre for *In bat-*

*tery?* A. The first and second motions of tierce-point, followed by the signal for reverse when the guns have advanced 21 yards.

1476. Q. What is the preparatory signal with sabre for *Action rear?* A. The first and second motions of rear point.

1477. Q. What is the preparatory signal with sabre for *Right (or left) front into battery?* A. The first and second motions of right (or left) moulinet, followed by the first and second motions of tierce-point.

1478. Q. What is the preparatory signal with sabre for *Right (or left) front into battery faced to the rear?* A. The first and second motions of right (or left) moulinet, followed by the first and second motions of rear-point.

#### ROUTE MARCHES.

1479. Q. What is the habitual column of route of a battery? A. The column of sections; but the column of platoons is preferable when that formation can be maintained for a considerable distance.

1480. Q. Where, in a general way, are the officers and non-commissioned officers of a battery on route marches? A. The captain is about 15 yards in front, followed by the trumpeters; the chiefs of platoons opposite the rear carriage of their platoons; the chief of caissons at the rear of the column.

1481. Q. Give commands and describe in a general way how to park the battery to the right? A. The captain directs the column 50 yards in rear of and parallel to the line to be occupied by the lead-drivers and commands, *Right into park; at (so many) yards' interval*. Chiefs of platoons repeat command. The chief of leading section commands, *Section right wheel*; captain then commands *March*, at which the leading section wheels to the right, and is halted by its chief when the leading driver arrives in line with the guidon. The other sections move forward until  $3\frac{1}{2}$  yards from the point opposite its place in park, when it wheels to the right at the command of its chief and is halted three yards from the line, when the chief commands, *Section halt; Left dress*.

1482. Q. Describe the movement of *Right, front, into park, at (so many) yards interval?* A. The leading section moves forward and halts at the command of its chief on arriving at the point established by the guidon; all the other sections oblique to the right until nearly opposite their places in park, when the chief commands *Forward, march*, and when at three yards from the line halts his section and commands *left dress*.

1483. Q. In horse batteries, if it is necessary to park with but 8 yards distance, what is done with the detachments? A. The captain directs them to leave the column by an oblique as the battery approaches the park.

1484. Q. What are the commands for forming *column of platoons* from column of sections? A. Captain commands *Form platoons; left (or right) oblique*. Chief of leading platoon, *Form platoon; left (or right) oblique*. Chief of other platoons, *Forward*; chief of leading section, *Forward*. Captain (repeated by chiefs of platoons and chief of leading section), *march*. The chiefs of rear platoons, *Form platoon; left oblique* in time to add *march*, when each leading section is 8 yards from the rear carriage of the preceding section.

1485. Q. In what way is the *oblique in column* executed by horse batteries different from field batteries? A. The carriages of the left sections do not march in the trace of the carriages which preceded the carriages on their right before the oblique, and the spaces between the carriages, measured perpendicularly to the oblique direction are different from those in field batteries.

1486. Q. Give command and describe how to form caissons on the flank from column of sections. A. Captain commands, *Caisson right (or left)*, repeated by chiefs of platoons. At the command *march* by the captain, the pieces move forward and the caissons oblique to the right; the leading piece halts after advancing 18 yards; the other pieces halt when each has closed to 2 yards; each caisson moves forward as soon as it has gained 15 yards, and halts when in line with its piece.

1487. Q. When caissons are ordered on the flank from column of sections, what is the formation called? A. A *flank column*.

1488. Q. Without giving commands, describe forming front into line from column of platoons at a halt? A. The leading platoon advances 19 yards and is halted; the other platoons oblique to the right (or left), and then move forward by half-wheeling to the left (or right) when the carriages are in rear of their places in line; on arriving at three yards from the line each platoon is halted, and then dressed to the left (or right).

1489. Q. If forming front into line from column of platoons, and the guide is not on the flank to which the movement is made, what must the captain do? A. Announce it on that flank of the column which will become the point of rest before giving any commands.

1490. Q. What modifications are necessary in forming *front into line faced to the rear* from column of platoons of the movement of forming front into line? A. The chief of the leading platoon commands, *Countermarch, march*, as soon as his platoon has advanced 19 yards, the guidon halting at the command *march*; on the completion of the countermarch the platoon is halted and dressed. The chief of the centre platoon commands *Countermarch* as soon as his lead-drivers are in line with the guidon, and adds *march* when they have advanced three yards beyond him; on the completion of the countermarch the platoon is halted and dressed.



The movement is executed in the same manner by the rear platoon as described for the centre.

1491. Q. Without giving commands, describe in a general way the movement of forming double column from line at a halt? A. The centre platoon moves forward, the guidon taking post when the guide is announced. The right platoon makes a left oblique, and the left platoon makes a right oblique. When the section nearest the column in each platoon is about to enter it, the platoons are formed in column of sections, the right forming in rear of the right and the left in rear of the left sections of the centre platoon.

1492. Q. In double column what is the position of the captain, the first sergeant, and chief of caissons? A. The captain takes post as in column of platoons; the first sergeant retains his post as in line; the chief of caissons follows the movement and places himself four yards in rear of the column, opposite the centre.

1493. Q. Give commands and describe movement of forming to and on right (or left) into line from double column? A. Captain commands, *To and on right (or left) into line*. Chief of leading platoon, *Platoon right (or left) wheel*. Chiefs of other platoons, *Forward*. Captain (repeated by chiefs of platoons), *March*. At this, the leading platoon wheels to the right and is dressed towards the pivot when its rear pivot-carriage has advanced its own length in the new direction. The other platoons advance: that on the right execute *to the right*, and that on the left *on right into line* when the leading section of each arrives opposite its place in line, the chiefs of sections giving the commands for their sections to wheel, halt and dress.

1494. Q. In wheeling a battery in line how will the section move? A. The pivot-section describes a quarter circle whose radius is 15 yards, and then moves off in the new direction; the other sections move at an increased gait, proportioning their swiftness to their distances from the pivot and preserving their intervals from it; they arrive on the line in succession, remaining as short a time as possible in rear, without urging their horses too much.

1495. Q. How is a battery in forming column from line wheeled on a fixed pivot? A. Captain commands, *Battery right (or left) march*. This is executed as described for the wheel, except that the radius is  $3\frac{1}{4}$  yards, and the chief of the right platoon halts his platoon as soon as the pivot-section is straightened out in the new direction.

1496. Q. By what means may a battery in line, at a walk, close and extend intervals? A. Captain (repeated by chiefs of platoons) commands, *On first (or such) section, to (so many) yards close (or extend) intervals; trot*. Chiefs of sections (except designated one) command, *Right oblique; trot*. The captain com-

mands, *March*, and then *Guide right* (or left). The designated section moves straight to the front at a walk; each of the other sections oblique.

1497. Q. Without giving commands, describe how a battery in line, at a halt, may be countermarched with diminished intervals. A. The right section of each platoon moves forward; when the sections are all disengaged the sections countermarch; when the guide is given at the completion of the countermarch the sections in rear take the trot, and resume the walk when in line.

1498. Q. How is the passage of obstacles accomplished? A. If any obstacle presents itself in front of a platoon during the march, the necessary commands either to break the platoon into column of sections, to close the interval, or to halt it and form it in column behind the adjoining platoon, are given by its chief without waiting for orders; after which the platoon resumes its place in line by increasing the gait, its chief habitually causing it to execute the movement the reverse of that by which it left its place in line.

1499. Q. Previous to all formations in battery, either from line or column, what must the captain do? A. By passage of carriages, he places the pieces in front or rear, if not already there, according as he desires forming in battery to the front or rear.

1500. Q. If at a halt in line, and the captain commands, *In battery march*, how is the movement executed? A. The caissons stand fast, and are dressed to their left by their chief. The chiefs of platoons and sections and the pieces march to the front in line at a walk. When the pieces have advanced twenty-one yards they reverse. Each chief of section commands, *Action* in time to add *Rear*, when the muzzle of his piece is in line with his horse's head; the piece halts at the command *rear*, and is prepared for firing.

1501. Q. How are the pieces in battery aligned? A. On their wheels.

1502. Q. If the pieces be in front at a halt, what is the method of coming in battery when the pieces are already on the line of battle? A. The captain commands (repeated by chiefs of platoons), *Action front*. At the command *Front*, each piece is prepared for firing; each caisson moves at a trot, executes a left about, and takes its place in battery by another left about, at a signal from the chief of caissons, who also halts the caissons by signal and aligns them to the left.

1503. Q. Describe how to form in battery to the rear from line, being at a halt. A. Captain commands (repeated by chiefs of platoons), *Action rear*. At the command *Rear*, the caissons advance at a trot 21 yards and take their place in battery by a *Reverse*.

1504. Q. What is the command for forming line to the front

from in battery? A. *Limber rear ; Pieces reverse ; Caissons forward, march ; Guide right (or left), or Battery halt.*

1505. Q. What is the command for forming line to the front from in battery when the caissons are in front? A. *Limber front ; Caissons pass pieces, march ; Guide right (or left), or Battery halt.*

1506. Q. Give commands and describe how to form in battery on the right from column of platoons? A. The captain commands, *On right into battery, march.* This is executed as for forming on right into line, except, the leading platoon having wheeled to the right, its chief commands, *In battery, march,* the first command being given when his pivot caisson, after completing the wheel, has advanced its own length in the new direction. The other platoons having wheeled to the right, the chiefs give their commands so as to form them in battery on a line with the leading platoon.

1507. Q. How do you form in battery from double column? A. The captain commands, *Right and left front into battery, march.* This is executed as for forming line to the front from double column, except that the chief of the leading platoon commands, *In battery, march,* the command *In battery* being given when the platoon has advanced six yards. As each of the other sections arrives in line its chief of section forms it in battery by the same commands.

1508. Q. If the pieces cannot be brought about by hand, give commands for forming in battery to the rear from battery. A. *Fire to the rear ; Limber rear ; Caissons pass pieces, march ; Pieces reverse, march ; Action rear.*

1509. Q. Give commands and describe how the battery, being in line at a halt, with pieces in front, is advanced in echelon of sections. A. Captain commands (repeated by chiefs of platoons), *Sections from the right (or left) ; Front into echelon.* Chief of right section commands, *Forward.* Captain commands, *March,* at which the right section moves forward, followed by its caisson. The next section moves forward by command of its chief as soon as its leaders are abreast the leaders of the rear carriage on the right ; the other sections commence the movement in succession, according to the same rule.

1510. Q. Without giving commands, describe how to retire a battery firing with prolonge fixed. A. Prolonges having been fixed, the caissons reverse so that their horses may face in the same direction as those of the limbers ; the cannoneers at each piece face about at the command *Retire,* and at the command *March* the limber moves off, dragging the piece ; the cannoneers, except Nos. 1 and 3, march on the left of the piece ; the gunner attends to the handspike, folding it over the flask in passing ditches, etc., and moves the trail to the right or left whenever

the direction is changed, so that the wheels will not cut the prolonge; No. 5 keeps it clear of the limber-wheels.

1511. Q. When a battery is to be marched a considerable distance in column of platoons, to what extent can the distance between platoons be reduced? A. To two yards.

1512. Q. What is the command for closing the column of platoons? A. *Close in mass; Guide right (or left), march.*

#### ORGANIZATION OF ARTILLERY.

1513. Q. Into what are artillery troops divided? A. Into *light artillery* and *heavy artillery*.

1514. Q. What does light artillery include, and what service especially belongs to it? A. It includes *horse batteries*, *field batteries*, and *mountain batteries*. To it belongs the service of the batteries that manœuvre with troops in the field.

1515. Q. How are machine batteries designated? A. According to their equipment and model of gun, as *horse*, *field*, or *mountain*.

1516. Q. What calibre guns are used for field and horse batteries? A. The 3.2 gun is used in both field and horse; the 3.6 is used only in field batteries.

1517. Q. What is the difference in the designation of the 3.2 and the 3.6 inch gun? A. The former is designated *light field* and the latter *heavy field battery*.

1518. Q. What is considered the *heavy artillery* of an army in the field? A. Those batteries which serve the siege and position guns and the artillery-ammunition and supply trains.

1519. Q. What is understood by *divisional artillery*? A. It consists of a battalion of from two to four batteries. It is an integral part of the division.

1520. Q. What is understood by *corps artillery*? A. It consists of two or more battalions, composed of field and horse batteries in suitable proportions, commanded by a colonel with proper staff of his rank.

1521. Q. What constitutes an artillery brigade? A. All the artillery attached to an army corps.

1522. Q. What is the proportion of light artillery to troops? A. From three to four guns to 1000 men.

1523. Q. What does a *battery* consist of? A. A fixed number of pieces and caissons, a battery wagon and forge, and a store wagon, together with a sufficient number of officers, men, and horses for its efficient service.

#### ARTILLERY IN THE FIELD.

1524. Q. As a tactical principle, how is artillery employed? A. In battalions of three or four batteries, or in groups of two or three battalions.

1525. Q. What should a battery do that has expended all its ammunition? A. Remain in its position until orders are received for it to change, as long as ammunition can be supplied. When no more ammunition can be had it should retire.

1526. Q. What is the principal duty of artillery in the offensive? A. To prepare for the infantry attack by coming into action at the earliest moment, and to endeavor to subdue hostile artillery fire. After preparing the attack the artillery energetically supports the action of the other arms.

1527. Q. What is the principal duty of the artillery in defense? A. It acts first to prevent the assault, and afterward to defeat it. The artillery duel should not be declined unless the artillery of the defense is weak or the ground is such as to compel the enemy to deploy at a great distance; otherwise the batteries should be kept concealed until the beginning of the infantry attack, and then devote its energies to the repulse.

1528. Q. When a battery is to be engaged, and arrives near its position, how is it divided? A. Into three echelons: the first, called the *first line*, comprises all the guns and the three caissons belonging to the right piece of each platoon in line or the leading piece of each platoon in column; the second echelon, called the *reserve*, comprises the remaining caissons, one pair harnessed wheel-horses, the unharnessed spare horses, and all the spare men for whom places cannot be provided on the caissons and spare horses for rapid movements; the third echelon, called the *train*, comprises the remaining spare men and the other paraphernalia of the battery.

1529. Q. Give commands and describe how the battery is subdivided for action. A. Captain commands (repeated by chiefs of platoons), *Prepare for action*. At this command the guidon joins the reserve and the cannoneers take post; the tompions and breech-covers are removed, and inspection is made to see that everything is in order. If the battery is in line, the captain commands (repeated by chiefs of platoons), *Form lines; First line forward, march*, at which the pieces and the three caissons move to the front. If in column of platoons, the command is, *Form lines; Reserve left oblique, or First line right oblique, march*, at which the designated carriages oblique out of the column. If the battery is in column of sections, the command is, *Form lines; Reserve right oblique, or First line right oblique*.

1530. Q. When the fighting battery moves forward, what becomes of the reserve? A. It follows so as not to be over 1000 yards in rear when the guns are placed in position, and the chief of caissons looks about for a suitable place to establish it with reference to security and easy communication with the fighting line. When such is found it is at once reported to the captain.

1531. Q. What duty is imposed on the reserve during action?

A. It makes good the losses of the battery in men and horses, and keeps it supplied with ammunition.

1532. Q. Should the fighting battery change position during action, what must be done regarding the reserve? A. The chief of caissons must be notified, and the reserve will follow the battery if it moves forward or by the flank, but will precede it if it moves to the rear and at the same gait.

1533. Q. What is done with the train when the fighting battery goes into action? A. The quartermaster sergeant in charge of the train follows the reserve as closely as possible without unnecessary exposure to the enemy's fire and without interference with the movements of troops; keeps up communication with the battery by means of mounted men, and rejoins the battery with his train at the end of the day's operations.

1534. Q. Into how many zones of fire-action is the battle-field divided, and what are their limits? A. Three: the first from 3000 to 2000 yards from the artillery line of defense; the second extends from 2000 to 800 yards; the third extends from 800 to the position.

1535. Q. Describe the kinds of fire to be encountered in the three zones. A. The outer limit of the first zone is within the range of effective artillery fire and the inner limit within the range of very effective artillery fire and also the range of unaimed infantry fire. Within the second zone, artillery fire is deadly; the infantry fire increases in effect up to the inner border, which is within the limits of aimed infantry fire. In the third zone the infantry fire is deadly.

1536. Q. What are the main points to be sought for in choosing a position for a battery going into action? A. A clear open range to the front and flanks, and especially the absence of cover for hostile skirmishers within effective rifle-range of the guns—if there is cover within range of the position, its approaches, especially the farther one, should be commanded; good cover for cannoneers and horses; a general front perpendicular to the line of fire; facility of movement in every direction; the avoidance of any conspicuous object in the immediate vicinity of the guns; the avoidance of stony ground. An abrupt slope, marsh, soft meadow, newly-ploughed ground, railroad cut, sunken road, canal, etc., in front of the guns is always desirable.

1537. Q. What is the best position that can be found for a battery going into action? A. Generally that in rear of the crests of ridges and low hills, the pieces being withdrawn as far as possible without losing the command.

1538. Q. To what extent may artillery advance under infantry fire? A. Seldom to less than 1000 yards if the infantry be firm, unless the latter itself is under infantry fire at a shorter range, or under a very effective artillery fire.

1539. Q. How should cannoneers protect themselves when the

enemy has penetrated the battery? A. By placing themselves between the gun-wheels and using their revolvers.

1540. Q. If the advance of the firing line masks the divisional batteries, what should they do? A. They should, if practicable, limber up and come into action on the firing line.

1541. Q. If the attack succeeds, what should the divisional batteries do? A. The nearest batteries should move rapidly to the captured position and come into action on the flank of the infantry and, if practicable, abreast its firing line, to aid in driving back the enemy and repelling any counter-attack.

1542. Q. If the infantry attack fails, what should the batteries do? A. All the batteries within range should concentrate their fire on the enemy's troops so as to cover the infantry and permit it to re-form. The batteries that accompanied the attack, if not already engaged, should immediately come into action.

1543. Q. What general principles govern a battery serving with a rear-guard, concerning close ranges? A. Artillery with a rear-guard avoids action at close ranges; it retires on successive defensive positions and delays the enemy by forcing his columns to deploy.

1544. Q. Where, as a rule, are the supports to artillery placed? A. Infantry supports are placed in front and cavalry supports in rear of the flanks of artillery. They should never be placed so as to mask the fire of a battery.

1545. Q. How are the different ranges for guns found? A. Either by trial shots or by means of the range-finder. The latter should be used whenever time and circumstances permit.

1546. Q. How may the inconvenience of smoke be diminished when the wind is across the range where a battalion of artillery is engaged? A. By increasing the interval between batteries; or it may be avoided by advancing the batteries in echelon, from the leeward flank, so that the smoke of each windward battery will drift behind those to the leeward of it.

1547. Q. Which of the projectiles used by artillery is the most effective against men and horses, and why? A. Shrapnel; its effect is due to the penetration of its bullets and splinters. It can be made to burst either in the air or on the first graze, and can therefore be made independent of the nature of the ground. Made to burst high by means of its time-fuse, it can be used against living targets behind cover; with its fuse cut short it can be used instead of canister at short ranges.

1548. Q. What is the habitual order of fire in each battery? A. By piece.

1549. Q. When should the fire at will be used? A. Only in the defense of the guns at very short ranges.

1550. Q. What does *Fire control* include? A. The method to be adopted for finding the range, the target, and the particular part to be fired at, the projectile used, the order and rapidity

of fire, and the concentration or distribution of fire upon the different targets within range.

1551. Q. In what manner should the ammunition be furnished to the guns while in action? A. Ordinarily the ammunition is drawn from one of the caissons, conveniently placed for the service of both guns. As soon as a caisson is emptied, it is replaced by one from the battery reserve, and the empty one, after joining the reserve, is sent to the ammunition column to be refilled. The limber ammunition should be regarded as a last reserve, to be used in emergencies only; whenever any of it is expended, it is replaced as soon as practicable.

1552. Q. What does the fighting battery of horse artillery, serving with a cavalry division, consist of? A. The pieces only, all the caissons marching with the battery reserve.

1553. Q. Where do the battery reserves of horse batteries with cavalry divisions march? A. They are consolidated and move in rear of the main body.

#### COVER FOR FIELD ARTILLERY.

1554. Q. What is understood as natural cover for artillery? A. That which the ground affords, which includes soft meadows, marshes, heights, slight unevenness, and ruts, low dikes, ledges of earth, hollow ways, etc.; and hedges, fences, thickets, woods, fields of grain, and the reverse side of hills, etc.

1555. Q. What is understood as artificial cover for artillery? A. Pits or intrenchments.

1556. Q. What are some of the objections to gun-pits? A. They are conspicuous targets; they restrict the free movement and full employment of the guns; they are limited in their application to the offensive, and there is difficulty in draining them.

1557. Q. Give some of the reasons favorable to the use of gun-pits. A. They furnish shelter to men and horses.

1558. Q. As no definite method has been provided for the construction of gun-pits, what foreign traces for them are considered the best? A. Those of the Austrian or German trace, as being the simplest and most speedily constructed.

1559. Q. In the construction of gun-pits what should be avoided? A. Narrow embrasures, as presenting an easy mark and as likely to draw the fire of the enemy.

1560. Q. If the position is occupied for some time, how should the parapet of a gun-pit be strengthened? A. By earth from a ditch in front.

1561. Q. How should the fresh earth of gun-pits be concealed from the enemy? A. By covering them with boughs, sod, or top soil of the surrounding color.

1562. Q. If pits for the limbers are constructed, what differ-



ence should be made in them from that of the gun-pits? A. They should be one foot deeper.

### CAMPING.

1563. Q. Give diagram illustrating a battery in park. A. (See pages 456 and 458, D. R.)

1564. Q. What is the first thing to be done with reference to the encampment of a battalion of light artillery? A. The adjutant assembles the guidons and conducts them to the camping ground, which has previously been selected, and establishes each one at the point where the lead team on the interior flank of his battery is to rest. After all are established, he returns to the column and indicates to each battery commander how and where his battery shall be parked.

1565. Q. At what distance from each other should the guidons be placed for the encampment of a battalion of artillery? A. There should be a distance of 94 yards where there are two lines of carriages of six horses each, and the picket line is in rear of the park.

1566. Q. Where should the tent of an artillery-battalion commander be placed when in park? A. Sixty yards from the line of guidons and on a perpendicular line passing 17 yards in rear of the second guidon, for an encampment of two or three batteries, and in a corresponding position in rear of the third guidon for an encampment of four batteries.

1567. Q. Where are the battery officers' tents in a battalion encampment of artillery? A. The captain's tent is 75 yards in rear of the line of guidons and 30 yards to the flank; the other officers' tents on a line with the captain's, at intervals of five yards—all facing the interior flank.

1568. Q. Where is the picket line, and where the line of men's tents in a battalion encampment of artillery? A. The picket line is 15 yards in rear of the carriages, and the enlisted men's tents 30 yards in rear of the picket line, the first sergeant being on the interior and the guard-tent on the exterior flanks.

1569. Q. In bivouacs how may the picket line be stretched? A. Through the hind wheels of the carriages of the third line; but whenever practicable it should be stretched along the ground or between trees or posts.

### TRANSPORTATION OF ARTILLERY.

1570. Q. When artillery and its stores are to be shipped for an expedition, what should first be done? A. There should be prepared a list of all the articles, stating their number, weight of each, and the total weight of each kind. Divide the total quantity to be transported among the vessels, and make statements in

duplicate of the articles on board each vessel, and the position of the different articles noted in a column in the list on board.

1571. Q. What is the most suitable car for carrying horses in railroad transportation? A. The slat stock car, built of slats and open all around. Another kind, known as the "combination car," is made with five doors on each side and one at each end, which may be closed tight for stores or with iron grates when carrying horses.

1572. Q. In loading horses on cars, how should it be done? A. They will be driven or led in, but should not be tied. They should have nothing more on them than their halter head-stalls.

1573. Q. In the transportation of horses by rail for a journey of more than thirty-six hours, how should they be cared for? A. They should be unloaded every twenty-four hours, and should be watered, fed, groomed, and exercised before being led back. If there be stock yards, they should be turned loose in them for exercise.

1574. Q. On what kind of cars should artillery carriages be transported by rail, and how should the carriages be loaded? A. On platform cars. The carriages are unlimbered and the spare wheels removed from the caissons; the body of a caisson, its stock to the rear, is run to the front end of the car, and its stock rested on the floor; another rear train is run forward in like manner until its wheels strike or overlap those of the first, when its stock is rested on the floor. A limber is then placed on the car, pole to the front, resting on the rear train; the second limber is backed on and its pole held up until a gun, trail foremost, is run under it; the trail of the gun is rested on the floor and the pole of the limber on the gun-carriage; the other gun is run on in the same manner; a limber is next run on, and its pole rested on the last gun; the remaining limber is then run on with its pole under the preceding limber. In this manner two field guns and two caissons complete may be placed on one car.

1575. Q. With what kind of food should men be provided when transported by rail? A. Cooked rations for the whole trip. Warm coffee, however, may be purchased at railroad stations.

1576. Q. In the transportation of horses by sea, what conditions should obtain as to the transport? A. The larger the vessel the better; ventilation is of primary importance; large air-ports or scuttles are indispensable, and wind-sails down every hatch to each deck should be insisted upon.

1577. Q. How should the horses be placed with regard to the manner in which they stand, on board of a transport? A. They should in all cases stand athwartship, as in this position they adapt themselves better to the motion of the vessel, and by facing each other they suffer less from fright and nervous excitement.

1578. Q. What ratio of spare stalls should be provided on a vessel transporting horses, and for what purpose? A. There should be ten per cent of spare stalls and at least one loose box; the former to admit of horses being shifted, rubbed down, their feet washed, and the stalls cleaned out every day that the weather permits. The loose box is to admit of a sick horse lying down.

1579. Q. How should horses be fed at sea? A. For the first few days on shipboard food is to be given rather sparingly and bran is to form a large portion of it; after the horse becomes more accustomed to his situation and his appetite increases, he should be more liberally fed. A bran mash, or oats and bran mixed, is to be given to him every other day.

1580. Q. Should any contagious disease appear among the horses at sea, what is done? A. The horse or horses attacked should be promptly thrown overboard and due precautions taken with the others.

1581. Q. How are the feed-troughs and nostrils of horses at sea cared for? A. Both should be washed every morning and evening with diluted vinegar.

1582. Q. At what rate is water allowed at sea? A. Six gallons a day per horse and one gallon per man.

1583. Q. Whose duty is it to see that everything is properly provided for the proper transportation of artillery by water? A. The fitting up of the vessel is generally done by the quartermaster's department; but the commander of the artillery to be embarked will, as the one most concerned, give his special attention to see that the work is thorough and complete.

1584. Q. What should be done regarding the care of horses after disembarking them from a long voyage? A. For some days they should be led about at a walk, and no weight put upon their backs, unless it is absolutely necessary.

[For Q. and A. on the subject of "Artillery Horses," see "Hippology."]

[For Q. and A. on the subject of "Stables," see "Hippology."]

#### SCHOOL OF THE BATTALION.

1585. Q. Are the means prescribed for the execution of the various movements of artillery to be strictly followed in field practice and actual service? A. No; the methods prescribed should be regarded as types, to be followed as closely as possible, each captain conducting his battery by the simplest means and the shortest practicable route to the nearest available place for it in the new formation.

1586. Q. When the battalion is formed for ceremonies or instruction, how will the batteries take their places? A. In an order depending on the rank of their captains, the first battery

on the right, the second on the left, the third at the right centre (or centre, if there be an odd number of batteries).

1587. Q. How are batteries placed on marches and in the field? A. They take any place assigned them by the commanding officer.

1588. Q. What is the normal interval of batteries in line? A. In light batteries 30 yards; in horse batteries 38 yards.

1589. Q. Give the posts of the major and staff of an artillery battalion. A. In line the major is 30 yards in front of the centre. The adjutant is in line with the chiefs of platoons and seven yards outside the right flank of the battalion. When the battalion faces to the rear, the adjutant executes an about and assumes his position in line, but does not change to the other flank. The sergeant-major is in line with the chiefs of platoons, seven yards from the left flank, and in facing to the rear executes on his flank what is prescribed for the adjutant. In line, at ceremonies, other staff officers are on the right of the adjutant, in order of rank from right to left; in column, they are in rear of the major. On all other occasions they accompany the major.

1590. Q. In formations, when will officers draw sabres? A. At formations preparatory to ceremonies the battery officers have the sabre drawn; the adjutant and sergeant major draw sabres before executing the about to leave the posts where they had marked the position for the right centre battery. At instruction the officers' sabres may be either drawn or in the scabbard, at the discretion of the major.

1591. Q. How is a successive alignment executed? A. The major causes one of the flank batteries to be advanced, and when it has been correctly aligned by its captain, he commands: *By battery, right (or left) dress*. At the command *Dress*, the captain of the second battery commands *Forward, march; Guide right*; and when his battery is three yards from the new line he commands *Battery halt*, places himself on the left, commands, *Right dress*, and when it is aligned, *Front*. Each of the other captains executes the same movement in succession.

1592. Q. When the batteries of a battalion in line are dressed, how are they aligned? A. The carriages are aligned by aligning the wheel-drivers.

1593. Q. What difference exists in the method of aligning some of the batteries of a battalion? A. The captain and chief of caissons of the battery first established, or nearest the point of rest, superintend the alignment from the flank of their battery nearest the point of rest. The captains and chief of caissons of the other batteries superintend the alignment from the flank of their battery farthest from the point of rest.

1594. Q. What are the commands for marching a battalion of artillery in line? A. *The second (or such) the battery of direction; Forward, march*.

1595. Q. Give the commands necessary to close and extend intervals between the sections of a battalion in line? A. *On first (or such) section, first (or such) battery; to (so many) yards close (or extend) intervals: Trot, march; the second (or such) the battery of direction.*

1596. Q. Before extending intervals simultaneously in each battery, what must be done? A. The major must first extend intervals between batteries.

1597. Q. How is a column of platoons formed to the right or left from a battalion of batteries in line? A. The major commands, *Platoons right (or left) wheel, march; Guide (right or left); or Batteries halt.*

1598. Q. What is the distance between batteries in column of platoons? A. In light batteries, 17 yards; in horse batteries, 20 yards.

1599. Q. What is the position of the major, adjutant, and the captains in column of platoons? A. The major is on the side of the guide, 30 yards from the column and abreast of the centre; the adjutant is abreast of the leading carriage of the column, on the side of the guide, 7 yards from the column; each captain is on the side of the guide, 15 yards from the flank of his battery, abreast of the chief of the leading platoon.

1600. Q. What is the position of the major and staff of a battalion of batteries in a route march? A. The major is at the head of the column, the adjutant one yard on his left; the trumpeter is in rear of the commanding officer, the sergeant major in rear of the adjutant. If there be other staff officers, they ride in rear of the major and adjutant; the trumpeter and sergeant major in their rear.

1601. Q. What is meant by successive formations? A. All the formations in which the several subdivisions arrive successively on the line, such as, *on right or left, into line, front into line; the deployment of columns; formations into line by two movements, etc.*

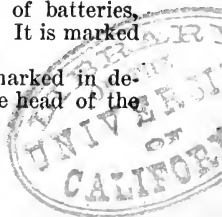
1602. Q. In forming on right or left into line from column of platoons, at what distance is the point of rest marked? A. It is marked 50 yards to the right of the head of the column.

1603. Q. In forming on right or left into line from column of batteries, at what distance is the point of rest marked? A. It is marked 62 yards to the right of the head of the column.

1604. Q. In forming front into line from column of platoons, at what distance is the point of rest marked? A. It is marked 19 yards in front of the head of the column.

1605. Q. In forming front into line from column of batteries, at what distance is the point of rest marked? A. It is marked battery distance in front of the head of the column.

1606. Q. At what distance is the point of rest marked in deploying? A. It is marked 3 yards in front of the head of the



column when the deployment is on the first battery, and 30 yards in front of the column when the deployment is on a rear battery.

1607. Q. Without giving commands, explain briefly how to form column of platoons front into line from a halt. A. The first battery executes right front into line, and moves to the front; the second battery executes column right, and the other batteries column half-right; the second battery is conducted opposite its place in line, changes direction to the left, and is brought right front into line at 19 yards from the line, then moved forward, halted, and dressed on the leading battery; the other batteries are conducted to a point battery distance and 19 yards in rear of the left of its place in line, change direction half-left, and when at 19 yards from the line conform to what is explained for the second battery.

1608. Q. Give commands and explain how to form front into line on the head of an interior battery at a halt. A. The major commands, *On third (or such) battery, Right (or left, front into line, march.* At the second command the captain of the fourth battery commands, *Forward, column right*; the captains of the first and second batteries, *Left into line wheel*, and all repeat the command *March.* The third and fourth batteries execute right front into line at the command *March*; the second battery is marched in line, with guide left, and when the front of it has to move  $3\frac{1}{4}$  yards to be opposite its place in line, the platoons are wheeled into line, and when this is completed the battery is formed right front into line faced to the rear. The first battery marches in line with guide left, and when the front of the battery has to move  $3\frac{1}{4}$  yards to be opposite its place in line, it wheels by platoons to the left, advances in column with guide left, and when 19 yards from the line executes right front into line faced to the rear.

1609. Q. What are the commands for forming column of platoons into line by two movements? A. To form to the left, a part of the column having changed to the right, the commands are, *Left into line wheel; Rear batteries, left front into line; march.* To form line to the right, the commands are, *Right into line wheel; Rear batteries, left front into line, faced to the rear; march.*

1610. Q. In forming from line into column and *vice versa*, when do the batteries change their designations? A. They preserve their line or column designations until the movement is completed.

1611. Q. What is a *platoon column*? A. A battery in column of platoons.

1612. Q. What are the commands for advancing in line of platoon columns from line? A. *Batteries, Right (or left) by platoons march; the second (or such) the battery of direction.*

1613. Q. To retire in line of platoon columns, what must first

be done? The major causes the batteries to reverse or counter-march, and then gives the commands for advancing.

1614. Q. Being in column of platoons at a halt, give commands and explain how to form front into line of platoon columns. A. The major commands, *Right (or left) front into line of platoon columns, march*. At the first command, the captain of the first battery commands, *Forward*; the captain of the second battery, *Forward, column right*; the other captains, *Forward, column half-right*, and all repeat the command *March*, and announce *Guide left*. The leading battery advances platoon distance and halts; the second battery moves opposite the left of its place in line, changes direction to the left, and then moves up to within three yards of the line, halts and dresses the leading platoon of his battery upon the leading platoon of the first, superintending the alignment from the right flank of his battery, and then takes his place in line of platoon columns; chiefs of the centre and rear platoons, see that they are aligned and at the proper distance. Each of the other captains conducts his battery to a point battery, plus platoon, distance in rear of the left of its place in line, changes direction half-left, and conforms to what is explained for the second battery.

1615. Q. When the intervals between the batteries is less than thirty yards, where will the captains take post? A. At one half the intervals from the flanks of their batteries.

1616. Q. Give the commands for advancing in line of double columns from line. A. The major commands, *Batteries, centre forward, march*; the second (or such) *the battery of direction*.

1617. Q. What are the positions of the major and staff and captains in double column? A. The same as when advancing in line of platoon columns.

1618. Q. In changing direction in line of platoon columns, where does the first battery halt, and how should the other batteries move? A. The first battery is halted when its rear pivot-carriage has advanced its own length in the new direction. The other batteries move forward, change direction half-right (or inclines to the right), and moves to a point battery distance and nineteen yards behind its place in the new line, again changes direction half-right (or inclines to the right), is halted on the line, and the leading platoon is dressed to the right.

1619. Q. In what manner is a close column formed? A. From line it is formed with the designated battery in front; from column, with the leading battery in front.

1620. Q. What is the distance between batteries in close column? A. Fifteen yards.

1621. Q. Give commands and describe how a column may be closed in mass from a halt. A. The major commands, *Close in mass, march*; *guide right (or left)*. The first battery stands fast. Each of the other batteries moves forward at the command *March*,

and halts when it arrives at fifteen yards from the one preceding.

1622. Q. How may a close column be formed from column of platoons or sections? A. To form it to the front, the major commands, *Close column; batteries right (or left) front into line; march.* The first battery executes right front into line; the other batteries move forward and execute right front into line at the proper distances. To form it to the right or left, the major commands, *Close column; first battery, column right (or left); march.* The first battery changes direction to the right and forms line to the left after moving fifteen yards in the new direction. The other batteries are formed in rear of the first, at proper distances.

1623. Q. In changing direction by the flank in close column, where does the adjutant post himself to mark the new alignment? A. He places himself in prolongation of the first section and about thirty yards in front of it.

1624. Q. In changing direction by the right flank in close column, how do the batteries reach their new positions? A. The first executes by the right flank and then moves column left, the captain halting opposite the point of rest, and as the lead-horses of the rear carriages of his rear platoon approach moves by the left flank and dresses his battery to the left. The other batteries move by the right flank, make two changes of direction half-left, and enter the new column in rear of and parallel to the first.

1625. Q. Give commands for forming column of platoons from close column. A. *Column of platoons; first battery right (or left) by platoons; march; guide right (or left).*

1626. Q. To form line to the right or left from close column, what must be done? A. The major first causes distance to be taken and then gives the commands for wheeling into line; or he breaks into column of platoons from the head of the column, and then wheels by platoons into line.

1627. Q. Give commands and describe how a close column may be deployed on the fourth battery. A. The major commands: *On fourth battery deploy column; by the right (or left) flank, march.* The fourth battery stands fast until unmasked; then moves forward to the line with the guide left, where it is halted and dressed to the left. The other batteries move by the right flank, with the guide left, until opposite their places in line; then by the left flank, with the guide left, to their places, and all dressed to the left. The captain of each battery in front of the fourth halts opposite the left of his position, and marches his battery by the left flank when the leaders of the rear carriages of his rear platoon are  $3\frac{1}{4}$  yards from him. The third and second batteries are halted immediately after the march by the left flank and move up to the line as soon as unmasked.

1628. Q. Being in line, at a halt, give the commands to advance



by echelon? A. *Batteries from the right (or left) at (so many) yards distance, front into echelon; march.*

1629. Q. Describe how the batteries move to the front in echelon, from the right in line. A. The right battery moves forward with the guide to the right; when it has advanced the specified distance the captain of the second battery puts his battery in march, with guide right, and so on to the left of the line.

1630. Q. Where will the guidons of each rear battery march, advancing in echelon from the right? A. A guidon of each rear battery marches on a line with the lead-drivers, and directly in rear of the left section of the battery preceding.

1631. Q. What are the commands for executing an oblique change of front in echelon? A. *Batteries, left (or right) half-wheel; march; the fourth (or first) the battery of direction; or, Batteries, halt.*

1632. Q. Previous to all formations in battery, either from line or column, if the pieces are not already there, what must the major do? A. By a passage of carriages, he places them in front or rear, according as he designs forming in battery to the front or rear.

1633. Q. Give the different commands for forming in battery from line. A. To form to the front, *In battery, march*; to form to the front by moving the caissons to the rear, *Action front*; to form to the rear, *Action rear.*

1634. Q. Give the commands for forming in battery to the right and left, and on right and left from column of platoons. A. The pieces being in front to form to the right or left, *Fire to the right (or left); Right into line wheel, march; in battery, march.* The caissons being in front, to form to the right or left, *Fire to the right; left (or right) into line wheel, march, action rear.* To form on right or left into battery, *On right (or left) into battery, march.* To form front into battery, *Right (or left) front into battery, march.*

1635. Q. What are the commands for forming in battery from line of double columns, with deploying intervals, or greater? A. *Batteries, right and left front into battery; or, right and left front into battery faced to the rear; march.*

1636. Q. Give the different commands for firing. A. To fire by piece, *Fire by piece; commence firing*; To fire by platoon, *Fire by platoon; commence firing.* To fire by battery, *Fire by battery; commence firing.* To fire at will, *Fire at will; commence firing.*

1637. Q. Should the major command, *Battalion, fire by piece, No. 1, first (or 6, fourth) battery, commence firing*, what is done? A. The pieces are fired under the direction of the captains, at the major's command *Continue the fire.* Each captain finds the range, and regulates the fire of his battery.

1638. If firing by battery, when the battalion consists of four

batteries, what will ordinarily be the interval between salvos? A. Thirty seconds; after the major has commanded continue the fire. If a slower or more rapid rate of fire is required, the major will command *Slow fire* (one minute between salvos), or *Rapid fire*, which should have an interval sufficient to observe the effect of one salvo before the next is fired.

#### CEREMONIES.

1639. Q. On occasions of ceremony, how are troops arranged? A. Except funeral escorts, they are arranged from right to left in line, and from head to rear in column, as follows: 1st, infantry; 2d, light artillery; 3d, cavalry. Artillery serving as infantry is posted as infantry; dismounted cavalry and marines are on the left of infantry; engineer troops are on the right of the command to which they are attached. When cavalry and light artillery are posted together, the artillery is on the left. In the same arm, regulars, volunteers, and militia are posted in line from right to left, or in column from head to rear in the order named.

1640. Q. When two or more battalions of artillery are formed for ceremonies, how are they posted? A. As may be directed by the officer in command; generally, horse-artillery is on the right of the line, or at the head of the column.

1641. Q. At ceremonies, mounted, where should the pieces be? A. Always in front.

1642. Q. When a column, at full distance, composed of two or all three arms of the service, forms line to the right or left, how does the battery or batteries come into position? A. They are wheeled into line to the rear, and when they have gained sufficient distance, they are countermarched and halted on the line.

#### GENERAL RULES FOR REVIEWS.

1643. Q. When a corps is reviewed, where is the artillery posted? A. The divisional and corps artillery are placed between the divisions; or, all the artillery of the corps may be massed and placed on the left of the infantry.

1644. Q. When artillery is reviewed with large bodies of infantry or cavalry, should the reviewing officer not approach the front of the artillery, when should he receive its salute? A. When he arrives at its right.

1645. Q. When a commander turns out of the column to place himself near the reviewing officer, what is his position? A. His place is on the right of the commanders already there.

1646. Q. When the commanding officer faces the line to give commands, what change is made by the staff and orderlies? A. They do not change their positions.

1647. Q. What is the duty of the captains whenever a battalion commander faces towards the battalions to give commands? A. They face their batteries at the same time, resuming their front after seeing the movement executed. In the same manner, captains and battalion commanders face toward the line when the review is by two or more battalions.

1648. Q. When two or more battalions are reviewed, what must each battery do after passing the reviewing officer? A. After its rear has passed some 30 yards it takes the trot for 100 yards, in order not to interfere with the march of the column in rear, and then, unless otherwise directed, returns to its camp by the most practicable route.

1649. Q. When it is necessary that an organization should be reviewed before an inspector, junior in rank to the commanding officer, what is done? A. The commanding officer will receive the review, and will be accompanied by the inspector.

#### REVIEW OF A BATTERY.

1650. Q. The battery being in line, what are the commands of the captain to prepare it for review? A. *Prepare for review; action front; right dress; front.*

1651. Q. In preparing for the review of a battery, what is done at the command *Front* by the captain? A. The chief of caissons takes his post in battery; the captain passes by the shortest line in front of the chiefs of platoons to the centre, places himself with the croup of his horse four yards in front of the heads of the horses of the chiefs of platoons, executes a left about and commands, *Draw sabre*, at which the first sergeant, quartermaster sergeant, stable sergeant, chiefs of sections and caisson corporals (if mounted) draw sabre.

1652. Q. State briefly how a reviewing officer should proceed with his review after the battery has been presented. A. He proceeds to the right of the battery, and is joined by the captain. He passes in front of the chiefs of platoons to the left of the line, and returns to the right, passing in rear of the chief of caissons, or between the lines of carriages. On reaching the right of the line, the captain passes to the rear of and takes his place on the left of the reviewing officer. He accompanies him a few yards, and then takes his post in front of the battery, the reviewing officer returning to the post for review.

1653. Q. By what commands is the battery put in motion for review? A. The captain first commands, *Limber front*; then, after seeing that movement executed, *Platoons right wheel, march; Battery, halt.* When the column is thus formed, the captain causes the cannoners to mount, and commands, *Pass in review; Forward, march; Guide right.*

1654. Q. After the battery is put in march for review, where

and when does the captain take post? A. He takes post four yards in front of the chief of the first platoon, immediately after the second change of direction.

1655. Q. What members of the battery salute the reviewing officer when passing in review? A. All the officers, the first sergeant, the quartermaster and stable sergeants, and non-commissioned officers in command of platoons.

1656. Q. Is the reviewing officer required to return the salutes of all persons? A. No; he returns the salute of the captain only.

1657. Q. How is a battery formed in line when reviewed with cavalry or infantry? A. It will be formed in line with the lead-drivers of the pieces dressed on the front rank of the infantry, or on the rank of the cavalry.

1658. Q. What commands will the captain give at the commands *Close ranks, march*, with infantry, or *Attention, posts*, with cavalry, at review? A. *Limber rear; Pieces reverse; Caissons forward, march; Battery, halt.*

#### REVIEW OF A BATTALION.

1659. Q. The battalion being in line, what commands are necessary to prepare it for review? A. The major simply commands, *Prepare for review*, when the captains prepare their respective batteries according to the commands and means prescribed for the review of a single battery.

1660. Q. In the review of a battalion in line, where will the adjutant and sergeant major take post? A. They take post seven yards outside the flanks of the battalion, the adjutant in line with the chiefs of platoons, the sergeant major in line with the lead-drivers of the pieces.

1661. Q. Is there any special difference in the commands and means for putting a battalion in march for review than that of a single battery? A. None, except that the major gives the commands necessary, substituting *battalion* for battery wherever necessary, and each captain takes his post in column as soon as the column is formed.

1662. Q. If it is desired to march the battalion in review in column of batteries in close column, what must be done? A. The close column must be formed on the leading battery immediately after the batteries have wheeled to the right.

1663. Q. When a battalion line is formed with diminished intervals for review, what difference exists from that of a review with full intervals? A. The guns are not unlimbered when line is formed.

#### REVIEW OF TWO OR MORE BATTALIONS.

1664. Q. How is the commanding officer of two or more battalions of artillery designated? A. As colonel.

1665. Q. What is the interval between battalions of artillery formed in line for review? A. Sixty yards.

1666. Q. What is done upon the arrival of the reviewing officer of two or more battalions? A. The colonel causes the trumpeter to sound attention, which, being repeated in each battalion, each major at once prepares his battalion for review.

1667. Q. When passing down the front of the line at a review of two or more battalions, how will the reviewing officer proceed? A. In rear of the line of battalion commanders to the left.

1668. Q. How is the interval between battalions of artillery in column at review estimated? A. The distance between the rear of the rear-rank carriages of a battalion and the lead-horses of the following battalion is the interval between battalions in line, plus the front of the subdivision in column (platoon or battery), less 32 yards (depth of a section).

1669. Q. In what manner may two or more battalions be formed in line for review? A. With full intervals, with closed intervals, or in two or more lines with full or closed intervals.

#### REVIEW OF A BRIGADE.

1670. Q. How is the review of a brigade of artillery conducted? A. As prescribed for the review of two or more battalions; the battalions are posted as directed by the corps commander.

1671. Q. What is the position of the brigade commander at review of a brigade of artillery? A. He is in front of the centre of the brigade, 60 yards in front of the line of majors.

1672. Q. When will the brigade commander and staff draw sabre at a review of the brigade? A. When the reviewing officer halts to receive the salute of the brigade, and when they take their places in column.

1673. Q. When and where does the brigade commander take position in column when the brigade passes in review? A. He takes post in column when at 100 yards from the reviewing officer; if the corps artillery leads, he is 30 yards in front of the colonel commanding it; if the divisional artillery leads, he is 30 yards in front of the trumpeters of the leading battalion.

#### BATTALION PARADE.

1674. Q. Describe the adjutant's duties at the parade of a battalion of artillery up to the point when the parade is formed. A. The captains having placed their batteries in line, the adjutant faces to the left, has *attention* sounded, and commands, *Action front*, which is executed by the captain as prescribed. The commanding officer having taken his post, the adjutant commands,

*Sound off*, at which the trumpeters pass down the front of the the battalion to the left and return in front of the captains. The adjutant then passes at a trot by the shortest line to a point half-way between the commanding officer and the centre of the line, faces the line, halts, and commands, *Present sabre*; after which he executes a left about, salutes the commanding officer, reports, *Sir, the parade is formed*.

1675. Q. Explain the adjutant's duties at the dress parade of a battalion of artillery from the time the commanding officer directs him to receive the reports to the termination of the parade. A. The adjutant executes a left about, commands, *Carry sabre*, and adds, *First sergeants, front and centre, trot; March*. The first sergeants move to the centre in rear of the line of officers, and face to the front, when the adjutant commands, *Report*. After each has reported the result of his formation, the adjutant commands, *First sergeants, posts; Trot; March*. When they have resumed their posts, he turns left about, salutes the commanding officer, and reports, *Sir, all are present or accounted for*; or, *Sir, (so many) officers (or enlisted men) are absent*. The commanding officer then directs him to publish his orders, at which the adjutant faces left about and commands, *Attention to orders*; reads the orders, and then commands, *Officers, centre, march*; the officers proceed to the centre, the adjutant passes through an interval left for him, moves four yards to the rear, turns about and halts. All the officers having formed, the adjutant rides up to his place in line.

1676. Q. At the dress parade of a battalion of artillery, who gives the commands for the line of officers to advance and to halt? A. The senior battery officer gives the command to advance and to halt.

1677. Q. At the dress parade of a battalion of artillery, what is the distance from the line of batteries at which the line of officers is formed at the centre? A. Eleven yards.

#### INSPECTION OF A BATTERY.

1678. Q. What are the commands of the captain in preparing his battery for inspection after being notified to do so? A. *Prepare for inspection; Action front; Right dress; Front*.

1679. Q. Where is the battery wagon and forge, if present, at an inspection of a battery? A. Fifteen yards from the left of the battery, in line with the pieces; the quartermaster sergeant four yards to the left of, and the stable sergeant boot to boot with, its lead-driver.

1680. Q. What is done with the battery wagon and forge at the command *Action front* at an inspection of a battery? A. It executes two left abouts, as prescribed for the limbers, and takes its place in line with them.

1681. Q. What numbered men open the chests of the battery at inspection? A. No. 5 opens the lid of the limber-chests of the pieces; No. 6 opens the lid of the caisson limber-chest, and, when so directed, the lids of the other chests. As soon as the battery wagon and forge have taken their places with the limbers the senior artificer opens the lids of the chests and resumes his post.

1682. Q. What should a battery carry for inspection? A. Every article that is furnished as part of its regular equipment, and for which there is a specially designated place assigned on the gun-carriage, limber, or caisson.

1683. Q. How should a battery appear in full marching order for inspection? A. The men in blouses and equipped with haversacks and canteens; knapsacks and saddle-bags packed; overcoats (when not worn) rolled and strapped to the knapsacks or saddles; blankets for mounted men strapped to the saddles; horses equipped with nose-bags and halters; caissons loaded with one day's forage.

1684. Q. If the battery be dismounted, in what formation is it inspected? A. In line at open order, with sabres drawn.

1685. Q. In the muster of a battery, what must each man do as he answers to his name? A. Each cannoneer steps one yard to his right or left, according as he is on the right or left of the piece, and returns to his place when the calling of the roll is finished; each mounted man, as he answers to his name, dismounts and stands to horse. They remount at the commands for the drivers.

1686. Q. If the battery be mustered dismounted, what is done? A. The ranks are opened and sabres drawn; each man after answering to his name returns his sabre.

#### FUNERAL ESCORT.

1687. Q. What are the escorts prescribed for officers of light artillery? A. Colonel, twelve pieces; lieutenant-colonel and major, eight pieces; captain, four pieces; lieutenant, two pieces.

1688. Q. By whom should an officer's funeral escort be commanded? A. When practicable, by an officer of the same grade.

1689. Q. By whom should enlisted men's funeral escorts be commanded, and what constitutes the escort? A. The escort consists of one piece, and is commanded by a sergeant.

1690. Q. In what order is a funeral-procession formed? A. Trumpeters, escort, clergy, remains and pall-bearers, mourners, members of the former command of the deceased, other officers and enlisted men, distinguished persons, delegations, societies, civilians.

1691. Q. Describe the movement of the escort from the house to the grave, etc. A. The escort marches at a walk to solemn music, and on arriving at the grave is formed in line with the

centre opposite the grave; the detachments are next brought to the front; the remains are then carried along the front of the escort to the grave, sabres are presented, and the trumpeters sound an appropriate air; sabres are then carried, and the escort brought to parade rest. After the coffin has been lowered into the grave and the funeral services completed, attention is ordered, cannon-eers are sent to their post, three salvos with blank cartridges are fired, and then "taps" are sounded by the trumpeters. The escort is then formed in column, marched to its assembling point, and dismissed.

1692. Q. When it is impracticable for the pieces of a funeral escort to approach the grave, what is done? A. They are left outside the inclosure; all officers and enlisted men, except drivers, dismount and turn over their horses to the drivers; the detachments are next formed in column of detachments; all except trumpeters draw sabres; the remains are escorted then to the grave, and the ceremonies as prescribed are performed. The ceremony at the grave being completed, the detachments are marched to the guns and three salvos fired.

1693. Q. What pall-bearers are provided in funeral ceremonies? A. Six, selected from the grade of the deceased, or the grades next above or below it. If a commissioned officer, the coffin is borne by six non-commissioned officers; if a non-commissioned officer or private, by six privates.



## PART VII.

### *DRILL—INFANTRY.*

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TEXT-BOOK—*U. S. Drill Regulations.*

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FOR SECOND LIEUTENANTS OF INFANTRY—Nos. 1694-2377.

FOR FIRST LIEUTENANTS OF INFANTRY—Nos. 1694-2467.

FOR CAPTAINS OF INFANTRY—Nos. 1694-2571.



## PART VII.

### DRILL REGULATIONS—FOR INFANTRY.

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#### DEFINITIONS.

1694. Q. What is an *alignment*? A. A straight line, upon which several men, or bodies of troops, are formed or are to be formed.

1695. Q. What is a *base*? A. It is the unit on which a movement is regulated.

1696. Q. What is a *centre*? A. It is the middle point or element of a command.

1697. Q. What is a *column*? A. A formation in which the elements are placed one behind another, whether these elements are files, fours, platoons, companies, or larger bodies.

1698. Q. What is meant by the word *deploy*? A. A movement to extend the front, as to pass from column into line.

1699. Q. What is *depth*? A. The space from head to rear of any formation, including the leading and rear elements.

1700. Q. What is *disposition*? A. The distribution of the fractions of a body of troops, and the formations and duties assigned to each for the accomplishment of a common end.

1701. Q. What is *distance*? A. An open space in the direction of depth. The distance between ranks in the same unit is measured from the breast of the man in rear to the back of the man in front.

1702. Q. How is the *distance* between two subdivisions in column measured? A. From guide to guide.

1703. Q. How is the distance between two commands in column—one in rear of the other, each comprising several fractions—measured? A. From the rear-guide of the command that is in front to the leading guide of the following command.

1704. Q. What is understood by *drill*? A. The exercises and evolutions taught soldiers and executed in the precise and formal manner prescribed.

1705. Q. What is the meaning of *echelon*? A. It is a word to

express the fact that subdivisions of a command are placed one behind the other, extending beyond and unmasking one another, either wholly, or in part.

1706. Q. For what purpose is this term employed in battle formation? A. To designate the different elements or lines in the direction of depth; as, *first echelon*, firing line; the *second echelon*, the support, etc.

1707. Q. What is meant by *evolution*? A. A movement executed by several battalions for the purpose of passing from one formation to another.

1708. Q. What is *facing distance*? A. The difference between the front of a man in ranks and his depth—about sixteen inches.

1709. Q. What is a *file*? A. Two men, the front-rank man and the corresponding man of the rear rank, whether placed one behind the other or side by side.

1710. Q. What is a *file-leader*? A. The front-rank man of a file.

1711. Q. When is a file said to be *blank*? A. When it has no rear-rank man.

1712. Q. When the troops are in one rank, may the men be termed files? A. Yes, when organized without a rear rank.

1713. Q. What is a *file-closer*, and for what purpose used? A. Officers or non-commissioned officers posted two paces in rear of the line; used to rectify mistakes and insure steadiness and promptness in the ranks.

1714. Q. What is meant by *flank*? A. A term to signify the right or left of a command in line or column—the element on the right or left of a line.

1715. Q. What is understood by a *flank attack*? A. A movement made against the enemy's flank.

1716. Q. What are *flankers*? A. Men so posted or marched as to protect the flank of a column.

1717. Q. What is a *flank march*? A. A march, whatever the formation, by which troops move along the front of the enemy's position.

1718. Q. What is the arrangement of the elements of a command termed? A. *Formation*; and signifies the placing of all the fractions in regular order in line, in column, or for battle.

1719. Q. What is the space or width occupied by a command, whether in line or column, termed? A. The *front*.

1720. Q. In estimating the extent of the front, what is the space occupied by one man taken at? A. Twenty-eight inches, which includes the interval between files.

1721. Q. In what other manner is the term *front* used? A. It denotes the direction of the enemy.

1722. Q. What is a body of troops marching in front of a command to reconnoitre and to protect its march termed? A. *Advance-guard*.

1723. Q. What is a body of troops to protect the rear of a command termed? A. *Rear-guard*.

1724. Q. What is a *guide*? A. An officer, non-commissioned officer, or private, upon whom the command regulates its march.

1725. Q. What is the leading element of a command termed? A. The *head*.

1726. Q. What is an *interval*? A. An open space between elements of the same line.

1727. Q. How is the interval between two men measured? A. From elbow to elbow.

1728. Q. How is the interval between companies, squads, etc., measured? A. From the left elbow of the left man or guide of the group on the right to the right elbow of the right man or guide of the group on the left.

1729. Q. What is meant by the term *left*? A. It is the extremity, or element of a body of troops, towards the left hand from the front of a command.

1730. Q. What is meant by a *line*? A. A formation in which the different elements are abreast of each other.

1731. Q. When these elements are in column, what is the formation termed? A. A *line of columns*.

1732. Q. What is the term *manœuvre* used for? A. To represent a movement made, according to the nature of the ground, with reference to the position and movements of the enemy.

1733. Q. What is the normal formation in which soldiers are regularly arranged in line or column termed? A. Close order.

1734. Q. What is *extended order*? A. The formation in which the soldiers, or the subdivisions, or both, are separated by intervals greater than in close order.

1735. Q. What is a *pace*? A. Thirty inches—the length of the full step in quick time.

1736. Q. How are the intervals and distances given in the tactics so that they may be verified? A. Those that can be verified by pacing are given in *paces*; those less than one pace, in *inches*; considerable distances, in *yards*.

1737. Q. What does the word *ploy* mean? A. To diminish front, as to ploy into close column.

1738. Q. What is a *point of rest*? A. The point at which a formation begins.

1739. Q. What is a line of men placed side by side called? A. A *rank*.

1740. Q. What is meant by the term *right*? A. The extremity or element of a body of troops towards the right hand from the front of a command.

1741. Q. What are *scouts*? A. Men detailed to precede a command on the march and when forming for battle.

1742. Q. What are the duties of scouts? A. They gather and

report information concerning the enemy and the nature of the ground.

1743. Q. What is meant by *tactics*? A. It is the art of handling troops in the presence of the enemy ; or, in other words, applying on the battle-field the movements learned at drill.

1744. Q. What is meant by a *turning movement*? A. It is an extended movement around the enemy's flank, for the purpose of threatening or attacking his flank or rear.

1745. Q. What does the term *wing* apply to? A. The portion of a command between the centre and the flank ; the battalion is the smallest body which is divided into wings.

#### SIGNALS.

1746. Q. In what manner may signals be used? A. They may be used alone or in conjunction with verbal commands, or trumpet-calls. The whistle-call, to fix the attention, may precede the signal.

1747. Q. In making signals, what may be held in the hand? A. The sword, rifle, or head-dress.

1748. Q. When the sword is used, how should it be held? A. In prolongation of the arm.

1749. Q. How would you indicate *Forward*? A. Raise the arm until horizontal, extended to the front ; at the same time move to the front.

1750. Q. How would a person indicate *Right oblique*? A. Raise the arm until horizontal, extended obliquely to the right ; at the same time move in that direction.

1751. Q. How would the *Left oblique* be executed? A. The same to the left.

1752. Q. How would you indicate : *By the right flank*? A. Raise the arm until horizontal, extended to the right ; at the same time move to the right.

1753. Q. Indicate *By the left flank*. A. The same as previously explained, except to the left.

1754. Q. What would indicate *To the rear*? A. Raise the arm until horizontal, extended to the rear ; at the same time move to the rear.

1755. Q. What would indicate *Change direction to the right or left*? A. Raise the arm until horizontal, extended toward the marching flank, carrying the arm horizontally to the front and right ; at the same time facing and moving in the direction to be taken.

1756. Q. How should *As skirmishers* be signalled? A. Raise both arms until horizontal, extended laterally.

1757. Q. What is the signal for *Halt*? A. Raise the arm vertically to its full extent.

1758. Q. What is the signal to *Assemble*? A. Raise the arm

vertically to its full extent and slowly describe small horizontal circles.

1759. Q. How may the *Rally* be signalled? A. Raise the arm vertically to its full extent, and circle it very rapidly.

1760. Q. What is the signal for *Cease firing*? A. A whistle-call.

1761. Q. What signal is used to fix the *attention*? A. A whistle-call.

#### GENERAL PRINCIPLES.

1762. Q. How will all details, detachments, and other bodies of troops be habitually formed? A. in double rank.

1763. Q. How may movements that are explained for execution toward one flank be used for the other flank? A. By substituting the word *left* for *right*, or the reverse.

1764. Q. How is it indicated in the command for movements where the guide may be either right or left? A. *Guide (right or left)*.

1765. Q. Can all movements be executed either from the halt or when marching? A. Yes, if not otherwise prescribed.

1766. Q. May all movements be executed in double time? A. Yes, if not specially excepted.

1767. Q. When must the command *Double time* precede the command march? A. When the movement is from a halt or when marching in quick time.

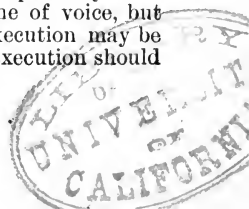
1768. Q. When should the command *Double time* be omitted? A. When marching in double time.

1769. Q. How many kinds of commands are used? Explain them. A. There are two kinds—the *preparatory*, such as *forward*, which indicates the movement that is to be executed; and the command of *execution*, such as *march*, *halt*, or *arms*, which causes the execution.

1770. Q. How are these two commands distinguished? A. The preparatory command is printed in *italics*, and those of execution in CAPITALS in the Drill Regulations.

1771. Q. In what manner should these commands be given? A. The *preparatory* command should be given at such an interval of time before the command of execution as to admit of its being properly understood. The command of *execution* should be given at the instant the movement is to commence.

1772. Q. What should be the tone of a command? A. It should be animated, distinct, and of a loudness proportioned to the number of men under instruction. Each preparatory command should be pronounced in an ascending tone of voice, but always in such manner that the command of execution may be more energetic and elevated. The command of execution should be pronounced in a firm and brief tone.



1773. Q. How should officers face when giving commands to troops? A. It is usually best to face towards them.

1774. Q. How is uniformity in giving commands secured? A. By practising the officers and non-commissioned officers in giving commands.

1775. Q. Who gives the commands where it is not mentioned in the text of the drill regulations? A. They are the commands of the instructor.

1776. Q. For what purpose should the signals and trumpet-calls be frequently used in instruction? A. In order that by accustoming the ear to them, the officers and men may readily recognize them.

1777. Q. Are instructors confined to the posts prescribed in the different schools? A. No; they go wherever their presence is necessary.

#### SCHOOL OF THE SOLDIER.

##### CLOSE ORDER.

1778. Q. What is the object of *the school of the soldier*? A. The instruction of the individual recruit and afterwards that of the squad.

1779. Q. How should drills be held? A. They should be short and frequent to prevent exhausting the attention of both instructor and recruit.

1780. Q. Who are the instructors of recruits and squads? A. Generally, sergeants and corporals, under the supervision of an officer; but the captain should occasionally require the lieutenants to act in that capacity.

1781. Q. What should be the bearing and demeanor of an instructor? A. He should always maintain a military bearing and by a quiet, firm demeanor set a proper example to the men.

1782. Q. What are the duties of the instructor? A. He is to explain each movement in as few words as possible, at the same time executing it himself. He requires recruits to take by themselves the proper positions, and does not touch them for the purpose of correcting them, except when they are unable to correct themselves; he avoids keeping them too long at the same movement, although each should be understood before passing to another; he exacts by degrees the desired precision and uniformity.

1783. Q. When does the instructor cease to confine himself to the order of movements laid down? A. After the movements have been properly executed by the recruits.

1784. Q. As the instruction progresses, what is done with the recruits? A. They are grouped according to proficiency, in order that all may advance as rapidly as their abilities permit.

1785. Q. What is done with those recruits who lack aptitude



and proficiency? A. They will be separated from the others and placed under experienced drill-masters.

1786. Q. When the execution of a movement is improperly begun and the instructor wishes to begin it anew for the purpose of correcting it, what command does he give? A. *As you were*; at which the movement ceases and the former position is resumed.

1787. Q. How are recruits placed for individual instruction without arms? A. A few, usually not exceeding four, are placed in a single rank, facing to the front, and about six inches apart, arranged according to height, the tallest man on the right.

1788. Q. How should recruits be taught to assemble? A. The instructor requires them to close the left hand and place the knuckles against the waist, above the hip, wrist straight, back of the hand to the front; he then places them on the same line, so that the right arm of each man rests lightly against the left elbow of the man next on his right, and then directs the left hands to be replaced by the side.

1789. Q. What command is given for the recruits to take their places after they have learned how to do so? A. *Fall in*; when they assemble as prescribed, at attention, each man dropping the left hand as soon as the man next on his left has his interval.

1790. Q. Describe the position of the soldier at *attention*. A. Heels on the same line, and as near each other as the conformation of the man permits; feet turned out equally, and forming with each other an angle of about sixty degrees; knees straight without stiffness; body erect on the hips, inclining a little forward; shoulders square and falling equally; arms and hands hanging naturally; backs of the hands outward; little fingers opposite the seams of the trousers, elbows near the body; head erect and square to the front, the chin slightly drawn in, without constraint; eyes straight to the front.

1791. Q. Describe the various *Rests*. A. *Fall out*; at which the men may leave the ranks, but will remain in the vicinity; *Rest*, at which the men keep one heel in place, but are not required to preserve silence, nor immobility; *At ease*, when the men keep one heel in place and preserve silence, but not immobility; *Parade rest*, when the right foot is carried six inches straight to the rear, with the left knee slightly bent, hands clasped in front of the centre of the body, left hand uppermost, and preserve silence and steadiness of position.

1792. Q. How is the position of the soldier resumed from the various positions of *Rest*? A. If the command *Fall out* has been given, the command *Fall in*; in all the others, the command *Squad, attention*.

1793. Q. How is a squad dismissed? A. By the simple command, *Dismissed*.

1794. Q. What should the soldier do at the command *Eyes right* (or *left*)? A. At the command right he should turn his head

gently, so as to bring the left eye in line with the centre of the body, the eyes fixed on the line of eyes of the men in, or supposed to be in, the same rank; the shoulders should not be deranged.

1795. Q. What command is given to cause the men to look to the front? A. *Front*.

1796. Q. What are *facings*? A. They are movements made by the individual soldier to change his front without moving forward.

1797. Q. Describe the various facings. A. *Right* (or *left*) *face*; at this the right heel and left toe is raised slightly and the soldier turns to the right on the left heel, assisted by a slight pressure on the ball of the right foot; he then replaces the right foot. The facings to the left are also executed upon the left heel. *About face*; at this command the left heel and right toe are raised slightly, and the soldier faces to the rear, turning to the right on the right heel and the ball of the left foot; he replaces the left foot beside the right.

1798. Q. What is the object of the salute with the hand? A. It is the form of military courtesy which should be extended by all inferiors to superiors, and must be acknowledged in the same manner by the latter.

1799. Q. Describe the salute with the hand. A. The hand is raised smartly till the forefinger touches the lower part of the head-dress above the right eye, the thumb and fingers extended and joined, palm to the left, forearm inclined at about forty-five degrees, hand and wrist straight. When the salute is acknowledged, the hand is dropped quietly by the side. If uncovered, the forefinger touches the forehead above the eye. Enlisted men salute with the hand farthest from the party saluted, giving the salute six paces before passing, and holding the hand at the visor until the salute is acknowledged.

1800. Q. Is the hand salute the same for officers as for enlisted men? A. Yes, except that the left hand is used only when the right is engaged.

1801. Q. What is the object of the *setting-up* exercises? A. To develop the soldier physically and give him a freedom of movement of all parts of the body, in order that the suppleness will relieve him as much as possible from fatigue in his various military duties.

1802. Q. In what particular exercises should the drill be alternated by frequent rests and varied by other instruction? A. In those which pertain to the *arm, hand, trunk, leg, and foot*.

1803. Q. By what command does any particular exercise cease? A. By the command *Halt*.

1804. Q. How should the recruits be placed for the setting-up exercises? A. In single rank, three paces apart.

1805. Q. Describe the first exercise. A. At the command *Arm exercise*, the arms are raised laterally until horizontal, palms up-

ward. At the command *Head*, the arms are raised in a circular direction over the head, tips of the fingers touching the top of the cap over the forehead, backs of fingers in contact their full length, the thumbs pointing to the rear, elbows pressed back. At the command *Up*, the arms are extended upward their full length, palms touching. At the command *Down*, the arms are forced obliquely back, and are gradually permitted to fall by the sides. At the command *Raise*, the arms are brought to the position as first described, and the exercise is continued by repeating *Head, up, down, raise*.

1806. Q. Describe the *arm exercise, front and rear*. A. At the command *Exercise*, the arms are raised laterally, as in the first exercise. At the command *Front*, swing the extended arms horizontally to the front, palms touching, heels on the ground. At the command *Rear*, swing the arms to the rear, inclining them slightly downward, raising the body upon the toes. The exercise is continued by repeating *Front, rear*.

1807. Q. Describe the *circle exercise with the arm*. A. At the command *Exercise*, the arms are raised as described in the first exercise. At *Circle*, slowly describe a small circle with each arm, upward and backward, from front to rear, the arms not passing in front of the line of the breast. This is continued by repeating *Circle*.

1808. Q. Describe the *shoulder exercise with the arm*. A. At the command *Exercise*, the arms are raised as in the first exercise. At *Shoulder*, place the tips of the fingers lightly on top of the shoulders, keeping upper arm horizontal. At *Front*, the elbows are forced to the front. At *Rear*, the elbows are forced back as far as possible. This is continued by repeating *Front, rear*.

1809. Q. Describe the *hand exercise*. A. At the command *Exercise*, the arms are raised as in the first exercise. At *Close*, close the hands with force. At *Open*, open the hands quickly, spreading the fingers and thumbs apart as much as possible. This is continued by repeating *Close, open*.

1810. Q. Describe the *forearm vertical exercise*. A. At the command *Raise*, raise the forearms until nearly vertical, fingers extended and joined, palms toward each other. At *Up*, thrust upward with force, extending the arms to their full length. At *Down*, force the arms obliquely back, and gradually let them fall by the sides. This is continued by repeating *Raise, up, down*.

1811. Q. Describe the *forearm horizontal exercise*. A. At the command *Raise*, raise the forearms to the front until horizontal, elbows forced back, hands tightly closed, backs down. At *Front*, thrust the arms forcibly to the front, turning the backs of the hands up, arms horizontal. At *Rear*, bring the arms back quickly to the first position, forcing elbows and shoulders to the rear. This is continued by repeating *Front, rear*.

1812. Q. Describe the *trunk down exercise*. A. At the com-

mand *Exercise*, raise the hands and place them on the hips, fingers to the rear, thumbs to the front, elbows pressed back. At *Down*, bend the trunk forward at the hips as far as possible. At *Back*, raise and bend the trunk to the rear as far as possible. These motions should be executed slowly without bending the knees. This is continued by repeating *Down, back*.

1813. Q. Describe the *trunk right* exercise. A. At the command *Exercise*, place the hands on the hips, as in the trunk down exercise. At *Right*, bend the trunk to the right without twisting it or raising either heel. At *Left*, bend the trunk similarly to the left. Execute both motions slowly. This is continued by repeating *Right, left*.

1814. Q. Describe the *trunk circle* exercise. A. At the command *Exercise*, place the hands on the hips, as in the trunk down exercise. At *Circle right*, bend the trunk to the right, and then turn it to the rear; turn the trunk to the left and bend to the left; turn the trunk to the front and bend forward. This is continued by repeating *Circle right*.

1815. Q. Describe the *arms vertical* exercise. A. At the command *Raise*, raise the arms from the side, extended to their full length, till the hands meet above the head, palms to the front, fingers pointed upward, thumbs locked, right thumb in front, shoulders pressed back. At *Down*, bend over till the hands, if possible, touch the ground, keeping arms and knees straight. At *Up*, straighten the body and swing the arms, extended, to the vertical position. This is continued by repeating *Down, up*.

1816. Q. Describe the *arms forward* exercise. A. At the command *Raise*, raise the arms to the front, extended to their full length, till the hands are in front of and at the height of the shoulders, palms down, fingers extended and joined, thumbs under forefingers. At *Down*, bend the trunk forward at the hips as far as possible and swing the arms backward, knees and arms straight. At *Up*, straighten the trunk and swing the arms to the forward position. This is continued by repeating *Down, up*.

1817. Q. Describe the *leg half-bend* exercise. A. At the command *Exercise*, place the hands on the hips as in the trunk exercise. At *Down*, lower the body, separating the knees and bending them as much as possible, heels on the ground, head and trunk erect. At *Up*, raise the body, straightening and closing the knees. This is continued by repeating *Down, up*.

1818. Q. Describe the *leg full-bend* exercise. A. At the command *Exercise*, place the hands on the hips, as in the trunk exercise. At *Down*, lower the body, separating the knees, and bending them as much as possible, head and trunk erect, heels raised, weight of body resting on the balls of the feet. At *Up*, raise the body, straightening and closing the knees, and lower the heels to the ground. This is continued by repeating *Down, up*.

1819. Q. Describe the *leg left* (or *right*) exercise. A. At the

command *Exercise*, place the hands on the hips, as in the trunk exercise. At *Forward*, move the left leg to the front, knee straight, so as to advance the foot about fifteen inches, toe turned out, sole nearly horizontal, body balanced on right foot. At *Rear*, move the leg to the rear, knee straight, toe on a line with the right heel, sole nearly horizontal. This is continued by repeating *Forward*, *rear*. When the recruit has learned to balance himself the command forward is followed by *Ground*, at which the weight of the body is thrown forward by rising on the ball of the right foot, and then advancing and planting the left, left heel thirty inches from the right, and advance the right leg quickly to the position of *forward*. This is continued by repeating *Ground* when the right and left legs are alternately in the position of *forward*.

1820. Q. Describe the *leg up* exercise. A. At the command *Exercise*, place the hands on the hips, as in the trunk exercise. At *Up*, raise the left leg to the front, bending and elevating the knee as much as possible, leg from knee to instep vertical, toe depressed. At *Up*, replace the left foot and raise the right leg as prescribed for the left. Execute slowly at first, then gradually increase to the cadence of double time. This is continued by repeating *Up* when the right and left legs are alternately in position.

1821. Q. Describe the *foot* exercise. A. At the command *Exercise*, place the hands on the hips, as in the trunk exercise. At *Up*, raise the body upon the toes, knees straight, heels together. At *Down*, lower the heels slowly to the ground. This is continued by repeating *Up*, *down*.

1822. Q. How may the exercises be continued without repeating the commands? A. After they are well understood, the instructor gives the commands as prescribed, and adds, *Continue the exercise*, upon which the movements will be continuously executed until the command *Halt* is given.

1823. Q. When may the exercises be discontinued with well-trained soldiers? A. When there is a regular system of gymnastic instruction.

#### THE STEPS.

1824. Q. What is meant by *quick time*? A. It is the time prescribed in which the soldiers shall take steps of thirty inches in marching, at the cadence of one hundred and twenty steps per minute.

1825. Q. What is understood when the command *Forward*, *march*, is given? A. That the soldier should move directly to the front in quick time.

1826. Q. How is the command *Forward*, *march*, executed? A. At the command *Forward*, the weight of the body must be thrown

upon the right leg without bending the left knee. At *March* the left leg is moved smartly without jerk, and the right foot is carried forward thirty inches from the right, measuring from heel to heel, sole near the ground, knee straight and slightly turned out; at the same time the weight of the body is thrown forward, and the foot is planted without shock, the weight of the body resting on it; next in manner, advance the right foot and plant it as above. Then continue the march, keeping the face to the front.

1827. Q. How is the cadence of the step indicated from time to time? A. The instructor calls out, *one, two, three, four*; or, *left, right*, the instant the left and right foot, respectively, should be planted.

1828. Q. What is *double time*? A. It is a movement to increase the rate of swiftness of a soldier's march to one hundred and eighty steps per minute with a thirty-six inch step.

1829. Q. In what manner is *double time* indicated? A. By always giving the command *Double time* just before the command *March*.

1830. Q. How should *double time* be executed? A. At the command *Forward* the weight of the body is thrown upon the right leg. At *Double time* raise the hands until the forearm is horizontal, fingers closed, nails toward the body, elbows to the rear. At *March* carry forward the left foot, leg slightly bent, knee somewhat raised, and plant the left foot thirty-six inches from the right; then execute the same motion with the right foot; continue this alternate movement of the feet, throwing the weight of the body forward, and allow a natural swinging motion to the arms.

1831. Q. What fact should be impressed upon the men with regard to breathing, when marching in *double time*? A. That they should breathe as much as possible through the nose, keeping the mouth closed.

1832. Q. Explain how to *mark time*. A. The command is, *Mark time, march*. At the command *March*, given as either foot is coming to the ground, the cadence of the step is continued, making a semblance of marching without gaining ground, by alternately advancing each foot about half its length and bringing it back on a line with the other.

1833. Q. How is the full step resumed from *mark time*? A. By giving the command *Forward, march*.

1834. Q. What is understood by the *short step*? A. It is a step of fifteen inches, in quick time, and eighteen inches in *double time*.

1835. Q. What is a *side step*? A. It is a step to the right or left of twelve inches, by carrying the foot to the right or left to that distance, keeping the knees straight and shoulders square to the front; as soon as either foot is planted the other is brought

up alongside of it, and the movements continued, observing the cadence for each foot as for quick time.

1836. Q. Can the side step be executed in *double time* or on the march? A. It cannot.

1837. Q. What is the *back step*? A. It is intended for a movement of a few paces to the rear without facing in that direction.

1838. Q. How may the back step be executed? A. It can only be executed from a halt by the command *Backward, march*, at which, step back with the left foot fifteen inches straight to the rear, measuring from heel to heel; then with the right, and so on until the command halt, at which the foot in front is planted beside the one in rear.

1839. Q. Can the back step be executed in *double time*? A. It cannot.

1840. Q. What steps may be executed from *mark time*, and conversely? A. The *short*, *side*, and *back* steps.

1841. Q. Explain how to *change step*. A. The command is, *Change step, march*. At the command *March*, given as the right foot comes to the ground, the left foot is advanced and planted; the toe of the right is then advanced near the heel of the left, and again stepping off with the left. The movement may be made with the left as explained for the right.

1842. Q. How should recruits be instructed in what is called *covering*? A. The instructor selects two points on the ground, or two stationary objects in the distance, and requires the recruit to march on them, so that the prolongation of the straight line through these points shall pass between his heels. Two recruit should also be established, one covering the other, and the others required to cover them at considerable distances apart. If covered properly, but one man or object is seen in front.

#### INDIVIDUAL INSTRUCTION WITH ARMS.

1843. Q. What must part of each drill with arms be devoted to? A. Marching.

1844. Q. In the instruction of recruits, in what manner is the manual of arms first executed? A. In single rank.

1845. Q. At the command *Fall in*, in what position should the pieces be placed? A. The men assemble with their pieces at *order arms*.

1846. Q. What should be done to prevent accidents when the men assemble under arms? A. The chambers should be opened by the instructor whenever the squad is first formed, and just before it is dismissed. This should be done with all squads, detachments, or companies.

1847. Q. What movements of the piece are not executed in cadence, but with promptness and regularity? A. The move-

ments relative to the cartridge, fixing and unfixing bayonet, adjusting sight, and breaking and forming stack.

1848. Q. How are the movements in the Manual of Arms divided for the purpose of instruction? A. They are divided into *motions*, and executed in detail.

1849. Q. By what command are movements executed in detail? A. The instructor first cautions—*By the numbers*; all movements divided into motions are then executed as follows: The command of execution determines the prompt execution of the first motion; *two, three*, etc., that of the other motions.

1850. Q. What command relieves the squad from the execution of movements in detail? A. *Without the numbers*, or when the instructor commands other movements than those in the Manual of Arms.

#### MANUAL OF ARMS.

1851. Q. In resuming the *carry* from any position in the Manual, what is the general rule regarding the motion next to the last and the last? A. It concludes with the left hand as high as the hollow of the right shoulder, fingers extended and joined, thumb close to forefinger, back of the hand to the front, elbow close to the body, right hand embracing the guard with thumb and forefinger. The last motion consists in dropping the left hand by the side.

1852. Q. What is termed the *balance* in the Manual of Arms? A. It is the *centre of gravity of the piece* with the bayonet unfixed.

1853. Q. What is the general rule as regarding the *left hand* at the balance? A. In all positions at the balance, except at the *port arms* and *charge bayonet*, the thumb is extended along the stock.

1854. Q. What is the general rule with regard to the positions of the piece *in front of the centre* of the body? A. The barrel is to the rear, and vertical.

1855. Q. How is the piece to be habitually carried with reference to the *hammer*? A. The hammer must be at the *safety-notch*.

[To the questions which are only answerable in the text of the Drill Regulations, the page of the D. R. is given in the answer. The paragraphs are simply numbered for the guidance of examiners.]

1856. Q. Describe the position of *order arms*. A. (Par. 50.)

1857. Q. Describe the position of *carry arms*. A. (Par. 51.)

1858. Q. Explain the *carry arms* from an order. A. (Par. 52.)

1859. Q. Describe the *present* from a *carry*. A. (Par. 53.)

1860. Q. The recruit being at a *carry* or *order*, describe the *right-shoulder arms*. A. (Par. 54.)

1861. Q. Describe the *carry arms* from *right shoulder*. A. (Par. 55.)



1862. Q. Describe the *order* from *right shoulder*. A. (Par. 56.)

1863. Q. The recruit being at a *carry* or *order*, describe *port arms*. A. (Par. 57.)

1864. Q. Being at *port*, to *carry arms*. A. Resume the *carry*, and drop the left hand by the side.

1865. Q. Being at *port*, to resume the *order arms*. A. Take the second and third positions of *order* from right shoulder.

1866. Q. Being at *right shoulder* describe, *port arms*. A. (Par. 58.)

1867. Q. To return to *right-shoulder arms* from *port*. A. Take the second and third positions of *right shoulder* from the *carry*.

1868. Q. What *rests* are executed as without arms? A. *Fall out*, *Rest*, and *At ease*.

1869. Q. On resuming attention from rests, what position is taken? A. The position of *order arms*.

1870. Q. Being at the *order*, describe *parade rest*. A. (Par. 60.)

1871. Q. Upon the command *Squad, attention*, what is done? A. The *order arms* is resumed, the left hand quitting the piece opposite the right breast.

1872. Q. How is an armed squad dismissed? A. By the command *Port arms, dismissed*.

1873. Q. How is the *bayonet fixed* from a *carry*? A. (Par. 62.)

1874. Q. How is the *bayonet unfixed* from a *carry*? A. (Par. 63.)

1875. Q. Can bayonets be fixed and unfixed from an *order* by the same commands as from a *carry*? A. They can; the piece being shifted from the right to the left side.

1876. Q. In fixing and unfixing bayonets from an *order*, and in returning to the *order*, where do the hands change? A. In front of the centre of the body, the left hand grasping the piece above the right.

1877. Q. How is the bayonet unfixed from *port arms*? A. As from the *carry*, quitting the piece with the right hand and lowering it with the left.

1878. Q. How should the rod-bayonet be fixed and unfixed? A. (Par. 65.)

1879. Q. How are bayonets fixed and unfixed while marching? A. In the most expeditious and convenient manner.

1880. Q. Describe the *charge bayonet* from a *carry*. A. (Par. 67.)

1881. Q. Describe the *charge bayonet* from an *order*. A. (Par. 68.)

1882. Q. How are the movements of kneeling, lying down and rising first taught? A. They are first taught without arms; but they are executed as with arms, except that in the position kneeling the right hand rests on the right thigh, and in moving to and

from the lying position, the right hand is placed on the ground ; in the position lying down the forearms are against each other on the ground, left arm in front.

1883. Q. What is the general rule to prevent accidents, on receiving the command to kneel, lie down or rise ? A. Before executing the command the hammer will be lowered to the safety-notch.

1884. Q. In the position of order *kneeling*, which rank faces half right ? A. The front-rank men.

1885. Q. How far do the front-rank men carry their feet to the rear, and which of the two feet ? A. So that the right toe shall be about ten inches to the rear and ten inches to the left of the left heel.

1886. Q. How is the *kneeling* accomplished ? A. Kneel on the right knee, bending the left, with the left toe inclined slightly to the right, and right leg pointing directly to the right.

1887. Q. Where does the *weight* of the body rest in kneeling ? A. On the right heel.

1888. Q. Where is the *left forearm* in the position of order kneeling ? A. Across the left thigh, hand hanging naturally.

1889. Q. Where is the *rifle* in the position of order kneeling ? A. It is not moved. It remains in the position of order arms, the right hand grasping it above the balance.

1890. Q. How do the men in the *rear rank* come to the position of order kneeling ? A. At the command *Kneel*, each rear-rank man steps off obliquely to the right with the left foot, planting the toe opposite the middle of the interval to his right and in line with the left heel of his front-rank man, at the same time placing the butt of his piece against his left toe; he then kneels as prescribed for the front-rank man.

1890a. Q. What is done at the command *Rise*, from the position of order kneeling ? A. The men rise and take the position of order arms, the rear-rank men covering their file-leaders.

1891. Q. What is the command for placing the men in a prone position ? A. *Lie down*.

1892. Q. If in the position of order kneeling, and the command *Lie down* is given, what is the first thing to be done by the front-rank men ? A. Each man places the right knee against the left heel, and draws back the left foot, placing the left knee on the ground beside the other.

1893. Q. What is the position of the body when prone ? A. It is flat on the belly, inclining the body about thirty-five degrees to the right.

1894. Q. What is the position of the rifle in a prone movement ? A. The toe of the piece rests on the ground, barrel up, left hand at the balance, left elbow on the ground, and the right hand at the small of the stock, opposite the neck.

1895. Q. What movement is made by the rear-rank men before assuming the prone position? A. They move back one pace.

1896. Q. If lying down, how do the men *rise*? A. By reversing the second motion of *lie down*.

1897. Q. In what position must the rifle be to execute the load? A. It may be either at the carry or order.

1898. Q. What is the position of the rifle at the termination of load? A. The muzzle must be at the height of the chin, the right hand at the small of the stock, against the right side at the waist, the rifle resting in the left hand at the balance.

1899. Q. Where does the left forearm rest if loading while kneeling? A. It rests across the left thigh.

1900. Q. When should cartridge-boxes be closed? A. After executing the *order or order kneeling*.

1901. Q. What is meant by the command *Ready*? A. It is intended to prepare the men and pieces for instant firing; to do this the piece should simply be cocked with the right thumb, and the thumb returned to the small of the stock.

1902. Q. Can the piece be brought to a ready from any position by the simple command ready? A. Yes, but in executing it the position of load must be first resumed.

1903. Q. If in the position of load or ready and the command *Order arms* is given, what must first be done? A. The hammer must first be lowered to the safety-notch.

1904. Q. How may it be ascertained if any of the pieces are loaded? A. The instructor commands *Open chamber*.

1905. Q. Are all the pieces held at open chamber until the squad or company is inspected? A. No; as soon as his piece is examined each man closes his chamber, lowers the hammer to the safety-notch, and returns the right hand to the small of the stock.

1906. Q. If the instructor does not wish to examine each piece after opening chambers, what command should he give? A. *Close chamber*, and port arms resumed.

1907. Q. How do the rear-rank men execute the *aim and fire*? A. Each man aims through the interval at the right of his file-leader, and inclines slightly forward, in order to advance the muzzle of his piece beyond the front rank.

1908. Q. When lying down in double rank, how do the rear-rank men aim and fire? A. They neither aim nor fire.

1909. Q. What is the object of commanding *Recover arms*? A. To accustom the men in the position of aim to wait for the command to fire.

1910. Q. In aiming kneeling, where does the left elbow rest? A. On the left knee, point of elbow in front of knee-cap.

1911. Q. What command must always precede that of aim? A. *At* (such and such an object), *at* (so many) yards, *squad*, *ready*.

1912. Q. For what purpose is this given? A. In order that the men may look at the object and arrange the sights on their pieces.

1913. Q. What is the *rifle salute*? A. Having the piece at a carry, and throwing the left hand smartly to the hollow of the right shoulder, forearm horizontal, palm of the hand down, thumb and fingers extended and joined, forefinger against the piece.

1914. Q. How are cartridge-boxes opened? A. With the right hand, the left hand steadying the piece near the muzzle.

1915. Q. At inspection of arms, with which hand does the soldier receive the piece from the inspector? A. With the left hand, at the balance.

1916. Q. What does the soldier do after receiving his piece back from an inspector? A. He resumes the port arms, closes chamber, brings the hammer to the safety-notch, unfixes bayonet, and returns to the order.

1917. Q. Where should an inspector always begin the inspection of a squad? A. He should begin on the right, but afterwards may pass in rear and inspect boxes from the left.

1918. Q. For what purpose do the front-rank men step back one pace when ordered to unsling knapsacks? A. For the purpose of clearing the stacks in facing about.

1919. Q. How far do the rear-rank men move back when ordered to unsling knapsacks? A. Three paces.

1920. Q. Which of the straps is unhooked in unslinging knapsacks? A. The right-hand strap.

1921. Q. In slinging knapsacks, what is the position of the knapsack after executing the command *Sling*? A. It is held by the straps, the flap next to the knees, the man standing erect.

1922. Q. What is the imperative rule regarding the stacking of arms? A. Stacks will not be made with the bayonet if the rifles have the stacking-swivel.

1923. Q. How must troops be arranged in order to stack arms? A. They must be in line, at an order, and fours counted.

1924. Q. What men make the stack? A. Each even number of the front rank with his own and that of each even number of the rear rank assisted by each even number of the front rank with his own piece.

1925. Q. What is done with the pieces of the odd numbers of the rear rank in stacking arms, as well as those of the guides and file-closers? A. The pieces of the odd numbers are passed to the even numbers in the front rank, who lay them against the stack. The pieces of the guides and file-closers are laid against the stacks nearest to them at the same time.

1926. Q. In taking arms, do the odd numbers of the front rank grasp their pieces with the right or left hand? A. With the right hand.

1927. Q. In taking arms, who passes the loose pieces to the rear? A. The even-numbered men of the front rank.

1928. Q. In breaking the stack made with the swivel, what movement is necessary to be made by the front-rank men in order to disengage the pieces? A. The odd-numbered men should turn their pieces to the right, while the even-numbers should turn theirs to the left.

1929. Q. In stacking arms with the bayonet, what is the position of the barrel of each piece as held by the front-rank men in forming the stack. A. The barrel of each even-numbered man of the front rank is to the rear; that of each even-numbered man of the rear rank is to the right; and that of the odd-numbered men of the front rank is to the front.

1930. Q. What is the position of the butts of the pieces when placed on the ground, in stacking arms, with both swivel and bayonet? A. The butts of the pieces of the even-numbered men of the front rank are between their feet; that of the even-numbered men of the rear rank 28 inches to the front and opposite the interval between the men; that of the odd numbers between the feet of the odd numbers.

1931. Q. How are arms stacked and stacks broken when troops are in single rank? A. On the same principle as established for double rank, except that, at the preparatory command, No. 3 steps back and covers No. 2, resuming his place after executing what is prescribed for him in forming the stack, and passes the piece of No. 4 to lay against the stack. In breaking the stack No. 3 passes the piece of No. 4 before taking his place in the rear rank.

1932. Q. What positions of the arms are intended mainly for extended order and route marches? A. *Trail, left shoulder, sling, and secure arms.*

1933. Q. How should the pieces be shifted when any of these commands are given? A. In the most convenient manner. The reduction of these movements to regular motions and cadence is *prohibited*.

1934. Q. What is the position of the piece at *trail arms*? A. It is in the grasp of the right hand above the balance, barrel up, muzzle inclined slightly to the front. When it can be done without inconvenience to others, the piece may be grasped at the balance and the muzzle lowered until the piece is horizontal. It may be carried in the left hand in a similar position to the latter.

1935. Q. What is the position of the piece at *left shoulder arms*? A. It rests on the left shoulder, barrel up, muzzle elevated so as not to interfere with the men in rear, trigger-guard in front of and near shoulder; left hand embracing the butt, the heel of which is between the first and second fingers.

1936. Q. What is the position of the piece at *sling arms*?

A. The right arm is passed between the rifle and the sling, which rests upon the shoulder; the piece is in rear of the shoulder and nearly vertical, muzzle up.

1937. Q. When may the piece be slung on the left shoulder?  
A. On route marches.

1938. Q. What is the position of the piece at *secure arms*?  
A. It is held in the right hand at the balance, barrel uppermost, sloping downward and to the front; the right hand supported against the front of the hip, upper arm against the stock. A corresponding position in the left hand may be used.

1939. Q. What is the general rule regarding the piece at the preparatory command for marching in quick time? A. If at an order, it should be brought to the right shoulder.

1940. Q. Suppose the command *Double time* be given, what is done with the piece? A. If at the order or carry, it is brought to the right shoulder at the command.

1941. Q. How is the disengaged hand held during double time?  
A. As when without arms.

1942. Q. From what positions may the piece be brought to an order on halting? A. Right or left shoulder, or trail.

1943. Q. At what movements of the body may the piece, if at an order, simply be raised to the trail? A. Facings, side or back steps, alignments, open and close ranks, and loadings.

1944. Q. What is laid down as a general principle with regard to the manual of arms and firings, in the battle exercises, or whenever circumstances require? A. That these movements may be ordered without regard to the previous positions of the piece; such movements as are not in the manual will be executed without regard to motions or cadence, in order that the effective use of the weapon may not be impeded by the formalities of drill.

### SQUAD DRILL.

1945. Q. What is the object of making a corporal the instructor of a squad? A. In order to give him the confidence and experience necessary to qualify him as a squad-leader, while at the same time teaching the recruits the movements in close and extended order.

1946. Q. Where is the corporal posted as squad-leader? A. The left man in the front rank. His rear-rank man steps into his place whenever it is necessary for him to leave it.

1947. Q. Who conducts the march when the guide is announced?  
A. The man on the designated flank.

1948. Q. When may facing distance be increased to thirty-six inches? A. When on rough ground or marching in double time.

1949. Q. When must the rear-rank resume the proper facing distance after marching at an increased distance? A. Upon halting.

1950. Q. How much is facing distance increased when the knapsack is worn? A. The depth of the knapsack.

1951. Q. What is the position of the corporal in forming a squad? A. He places himself in front of where the centre is to be.

1952. Q. After first sizing a squad, is it always necessary to go through this manoeuvre when the squad is formed? A. No; the men are cautioned to take the same relative positions as at first given.

1953. Q. How are alignments first taught? A. By requiring the recruits to align themselves upon two files which the instructor establishes as a base.

1954. Q. By what command is this base established? A. *Two files from the right (or left), three paces to the front, march.*

1955. Q. By what command do the others move up? A. By the simple command *Next*.

1956. Q. How close to the line should a man approach before he commences to dress up to it? A. To about six inches in rear.

1957. Q. In dressing to the right or left, what is the difference with regard to placing the hand upon the hip? A. In dressing to either the right or left the left hand is placed upon the hip; but in dressing to the right the man places his right arm against the elbow of the man on his right, while in dressing to the left he places his left elbow against the arm of the man on his left.

1958. Q. How do the men execute a *right (or left) backward dress*? A. By stepping backward and halting a little in rear of the base-files, and then dressing up by steps of two or three inches.

1959. Q. What is meant by *marching in line*? A. The entire squad marching side by side, preserving a regular alignment from one flank to the other.

1960. Q. If marching to the front, and the command *To the rear, march*, is given, when should the command *March* be given? A. As the right foot strikes the ground.

1961. Q. How is the movement of marching to the rear executed? A. By advancing and planting the left foot, then turning on the balls of both feet, and stepping off with the left foot.

1962. Q. If marching in double time, how is the march to the rear executed? A. By turning to the right about, taking four short steps in place, preserving the cadence, and then stepping off with the left foot.

1963. Q. To march in column of files, what is the difference in the command from being in line at a halt, or marching? A. From a halt, the command should be, *Right (or left) face, forward, march*; while marching, it should be, *By the right (or left) flank, march*.

1964. Q. If marching, how is a change of direction in column of files executed? A. The leading file wheels to the right, the

pivot-man shortening two or three steps and moving over a quarter or an eighth of a circle whose radius is about eighteen inches ; the other files follow the first and wheel on the same ground.

1965. Q. What is the position to be maintained in an oblique march from being in line? A. Each man preserves his relative position, keeping his shoulders parallel to those of the next man on his right (if obliquing to the right), and so regulates his step as to make the head of this man conceal the heads of the other men in the rank.

1966. Q. At the command *Halt*, on an oblique march, how do the men face? A. To the original front.

1967. Q. If the command *Mark time* is given while obliquing, how do the men face? A. In the direction in which they are obliquing.

1968. Q. If the command *Forward* is given while marking time at an oblique, in which direction is the march continued? A. In the direction of the march previous to obliquing.

1969. Q. If marking time in an oblique movement, how is the march continued in the oblique direction? A. By the command *Oblique, march*.

1970. Q. What step is prohibited in the oblique march? A. The short step.

1971. Q. Where is the guide in an oblique movement? A. He is always, without indication, on the side toward which the oblique is made.

#### TURNINGS.

1972. Q. If the squad be marching in line, or at a halt, and the command *Squad, right (or left), march*, is given, how is it executed? A. At the command *March*, the right file halts and the front-rank man, or pivot, faces to the right ; the others half-face to the right, and, without changing cadence or step, move up and place themselves successively upon the alignment.

1973. Q. If the men are at a halt and order arms when the command *Squad, right, march*, is given, how are the pieces held? A. At trail arms.

1974. Q. If it is desired to change direction and advance, what command is given, and what is the difference of execution from that of *Squad, right*? A. The front-rank man on the right, instead of halting, turnst o the right and moves off in the new direction with a short step, but without changing cadence ; the other men half-face to the right and move up on the line, when they take the short step. When the last man has arrived on the new line the instructor commands, *Forward, march*, when all resume the full step.

1975. Q. Where is the guide during a turn? A. He is, without command, on the pivot-flank.



1976. Q. If the command *Halt* be given during a turn, what is done? A. Those men already on the line halt, while those in rear move up and place themselves in line.

#### FIRINGS.

1977. Q. Where is the post of the instructor in the firings? A. Three paces in rear of the squad, but in actual firing he places himself where he can best be heard and at the same time observe the effect of the fire.

1978. Q. Are the commands the same for firing from all designated positions? A. They are, whether standing, kneeling, or lying down.

1979. Q. What must the rear-rank men do at the preparatory command for firing? A. If in line standing, they close, as explained for loading, and the cartridge-box, if worn, is slipped to the right hip and opened.

1980. Q. When should the cartridge-box be closed? A. After executing *cease firing*.

1981. Q. What must be indicated in the preparatory commands for all kinds of fire? A. The objective and range.

1982. Q. Suppose the objective to be at a considerable angle to the front of the squad, what must be done? A. The instructor must change the front of the squad so as to face it.

1983. Q. What must be done at the command *Cease firing*? A. The men must stop firing at once, draw cartridge or eject the empty shell, lower the sight-leaf if raised, and take the order—order kneeling or the position lying down. If standing, the rear-rank men step back and cover their leaders.

1984. Q. What command is given if the instructor desires the men to cease firing, but have the pieces ready for other firing? A. *Cease firing, load*.

1985. Q. What is meant by firing at will? A. At the command *Commence firing* each man aims, fires, loads, and continues firing independently of the others until the command *Cease firing* is given.

#### BAYONET EXERCISE.

1986. Q. What is the object of the bayonet exercise? A. To teach the soldier to be quick and proficient in handling his piece.

1987. Q. What is the normal interval and distance between men when armed and unarmed in bayonet exercise? A. Four paces when armed and two when unarmed.

1988. Q. How are the distances in bayonet exercise obtained from line at a halt? A. By commanding, *To the right (or left) take intervals, march*; the rear rank moves back four paces at the preparatory command, and at the command *March* the left man

of each rank stands fast, while the others face to the right and move off, each man halting and facing to the front as he obtains his interval from the left.

1989. Q. When it is desired to assemble the squad, on which flank is it assembled? A. On either right or left, the man on the designated flank standing fast, while the others close in on him and face to the front.

1990. Q. How may distances be taken to the front from line at a halt? A. By giving the command *Front, take distance, march*; at which Number 1 of each set of fours of the front rank moves straight to the front; Number 2 moves off as soon as Number 1 has the specified distance; the other numbers move off in like manner; the rear rank executes the same movement as soon as Number 4 of the front rank has advanced the proper distance. All having their distances, the instructor gives the command to halt.

1991. Q. In what manner is the assembly made when at intervals to the front? A. Number 1 of the front rank stands fast; all the others move up and take their proper places.

1992. Q. Describe the names of the movements in bayonet exercise. A. *Guard; advance; retire; front and rear pass; right and left, and right and left rear volt; right or left, right and left low, and head parry; thrust; lunge; butt to front, right, and rear.*

1993. Q. What should every movement to the front or rear be followed by? A. To the front by an attack; to the rear by a parry and a thrust.

1994. Q. What movements may be designated as foot movements, what are the piece movements, and which are those combining the two? A. The foot movements comprise the *advance, retire, pass, and volt*. The piece movements are *guard, parry, thrust, lunge, and butt to the front*. The combined movements are *guard, lunge, and butt to the right and rear*.

#### SCHOOL OF THE COMPANY.

1996. Q. How should a company be grouped, who controls, the groups, and what is the object of grouping? A. It is grouped into *squads*, under the leadership and immediate control of the non-commissioned officers, for the purpose of discipline and order in camp and quarters and recognition as leaders on the battle-field.

1997. Q. Of how many men does the squad consist, and who is the authorized leader? A. Of four files—a corporal and seven privates, the corporal being the squad-leader.

1998. Q. In what other manner is the company subdivided, and of what are these subdivisions composed? A. Into *sections*, composed of two or three squads, under a sergeant as chief of

section ; and into two *platoons*, composed of two sections commanded by the first and second lieutenants respectively.

1999. Q. How are front-rank men who are absent replaced ? A. By their rear-rank men.

2000. Q. Which platoon should be the stronger in the event of an odd number of fours ? A. The first platoon.

2001. Q. Can the division by platoons be omitted ? A. Yes, when less than four sets of fours are present.

2002. Q. When is the division into sections omitted ? A. When the platoon consists of less than four sets of fours.

2003. Q. Which section will be the stronger when a platoon consists of an odd number of fours ? A. The right section.

2004. Q. How are platoons and sections numbered ? A. From right to left in line, and from head to rear when in column.

2005. Q. In what manner are these designations changed when faced about ? A. The right becomes the left of the, line or the head becomes the rear of the column.

2006. Q. Give diagram of posts of officers, non-commissioned officers, and the field-music of a company, and describe them. A. (See p. 64, Drill Regulations.)

2007. Q. Who is responsible for the theoretical and practical instruction of the officers and non-commissioned officers of a company, and how is this accomplished ? A. The captain, who requires them to study and recite the drill regulations, so that they can explain thoroughly every movement before it is put into execution.

2008. Q. In sizing a company, how must the non-commissioned officers place themselves ? A. The corporals place themselves according to height, the tallest as the *seventh* man, the others as every *eighth* man in rear. After the company has been divided into platoons and sections, the sergeants take their posts.

2009. Q. After a company has been once sized, is it necessary at every formation to resize it ? A. It is not ; the men should fall in in their proper places.

2010. Q. What is the method of forming a company after it has once been sized ? A. The first sergeant takes a position in front of where the centre of the company is to be, and, facing it, commands, *Fall in*, at which the second sergeant places himself, facing to the front, where the right of the company is to rest, and at such a point that the centre of the company will be six paces from and opposite the first sergeant ; the fours form in their proper places on the left of the second sergeant, directed by the other sergeants, who then take their posts. The first sergeant brings the company to right shoulder arms, calls the roll (each man answering "Here," and bringing his piece to an order), faces about, salutes the captain, and reports the result of the roll-call. He then takes his post by passing around the right flank.

2011. Q. If any of the sets of fours contain less than six men, what is done by the first sergeant? A. He increases them to six or seven men by taking the required number from a like number of fours, at the rate of one from each, Number 3 or Numbers 2 and 3 being blank files; if the four on the left consists of less than four men, they are assigned to other fours and placed in the line of file-closers in rear of the four to which assigned.

2012. Q. In forming the company, when do the lieutenants take their posts? A. They take post and draw swords as soon as the first sergeant has reported.

2013. Q. If a company becomes reduced in number and the fours broken up, how is the organization preserved? A. By the men falling in regardless of fours, but in their relative order, closing to the right so as to leave no blank files—the corporals placing themselves as Number 4 of the front rank; the roll is called, fours counted, and, if large enough, the company is divided into sections and platoons.

2014. Q. What does the captain do at each alignment of the company? A. He steps back two paces in prolongation of the line before he gives his command.

2015. Q. To whom else does this rule apply? A. To chiefs of subdivisions in column in company and battalion drill.

2016. Q. When do guides take their posts? A. At the command *Front*.

2017. Q. What are the duties of the captain in opening and closing ranks? A. After giving his preparatory command, he goes to the right flank and sees that the guides are on a line parallel to the front rank, then places himself facing to the left three paces in front of the right of the company and commands, *March*; he then aligns the officers and the front rank, and verifies the alignment of the rear rank (which is aligned by the right guide) and file-closers; after which he commands, *Front*, and takes his post three paces in front of the right guide, facing to the front. In closing ranks, the captain faces the company, commands, *Close ranks, march*, and takes his post in front of the centre of the company.

2018. Q. What movements does the company execute the same as described in the School of the Soldier by substituting in the command *company* for *squad*? A. *Halts, rests, facings, settings up, steps, marchings, turnings, manual of arms, and firings*; resumes *attention, kneels, lies down, and rises*.

2019. Q. Where does the captain go when executing the *turn and halt*? A. He goes to the pivot-flank.

2020. Q. When does the captain place himself in rear of the company in the different firings? A. At the first command for loading or for firing.

2021. Q. What men are exempt from executing the loadings and firings? A. The men in the line of file-closers.

2022. Q. What portion of the manual of arms are any of the men excused from executing on drill and during ceremonies? A. Guides and enlisted men in the line of file-closers execute the manual of arms during drill, unless specially excused, when they remain at an order. During ceremonies they execute all movements.

2023. Q. How do the guides in front marking the line stand? A. At an order, facing the point of rest.

2024. Q. Being in line, what is the command for marching a company by the flank? A. *Fours right (or left), march.*

2025. Q. Is the wheel by fours made on a fixed or movable pivot? A. Fixed pivot.

2026. Q. What does the rear rank do to get its distance? A. After the wheel is completed, the rear rank shortens its step until forty-four inches is gained.

2027. Q. Where is the captain's position in marching by the flank, and when does he take that position? A. In column of fours, twos, or files he is by the side of the leading guide, on the flank opposite the file-closers. He takes that position at the command *March*.

2028. Q. Is it necessary to give any commands in order to continue the march after wheeling by fours to the right or left? A. The forward march is taken in all cases upon the completion of the wheel, unless the command *Halt* be given.

2029. Q. By what command is a change of direction made by a column of fours in march? A. *Column right (or left), march.*

2030. Q. How may a column of fours be put in march and change direction at the same time? A. By commanding, *Forward, column right (or left);* or, *Column half-right (or half-left), march.*

2031. Q. If in line, how can you form column and change direction? A. By commanding, *Fours right (or left), column right (or left);* or, *Column half-right (or half-left), march.*

2032. Q. What movement is intended by giving the command *Right forward, fours right, march*, from line? A. It is intended to march in column of fours by the right to the front.

2033. Q. In making an oblique movement in column of fours, who is the guide of the column? A. The leading guide when the oblique is toward his flank, and the guide of the front rank of the leading four when the oblique is toward the opposite flank.

2034. Q. What becomes of the file-closers when the column of fours is marched to the rear? A. They retain their relative positions on facing about, but gain the space to the right or left necessary to preserve their interval from the flank.

2035. Q. What becomes of the file-closers in forming line from column of fours toward their side? A. They close in to the

flank of the column at the preparatory command, and at the command *March* dart through the column, taking their places in rear.

2036. Q. In forming *on right into line* from column of fours, where do the right and left guides march? A. The right guide on the right of the leading four, and the left guide in rear of the left four until it halts, when he places himself on its left.

2037. Q. When does the rear rank close to facing distance in forming *on right* (or *left*) *into line*? A. As each set of fours commences to wheel.

2038. Q. When is the command *Halt* given in forming *on right* (or *left*) *into line*? A. When the leading four has advanced company distance in the new direction.

2039. Q. When should the command *Front* be given in forming *on right* (or *left*) *into line*? A. When the left four completes its dressing.

2040. Q. Suppose the movement of *on right* (or *left*) *into line* be executed toward the side opposite the file-closers, what will they do? A. They will follow the four nearest them, passing in front of the following four.

2041. Q. What is meant by *front into line* from column of fours? A. A movement by which all the fours except the leading four pass obliquely to the right or left until opposite their places in line, and then move up squarely to the line established by the leading four, halting and dressing thereon.

2042. Q. If the movement of front into line be made toward the side of the file-closers, what will they do? A. They will dart through the column as the oblique commences.

2043. Q. Suppose the movement of front into line is made in double time, how is it executed? A. The leading four moves forward in quick time, while all the other fours move in double time, taking the quick time when arriving in line, dressing toward the side of the guide—the instructor having announced the guide immediately after giving the command *March*.

2044. Q. Being at a halt in line, how may the company be marched to the rear? A. If of any distance, the fours will be wheeled about; but if only a short distance is to be gained the command will be, *Company, about face, forward, guide right* (or *left*), *march*.

2045. Q. How are obstacles in the line of march passed when marching in line? A. By breaking one or more fours from the right or left to the rear; if from the right, the designated fours execute left forward, fours left, on the four that remains in line next on their left; if from the left, the reverse is executed. If the obstacle is so great as to cover all the front of the company, except one set of fours, then the entire company is thrown into a column of fours by executing *right* (or *left*) *forward, fours right* (or *left*).

2046. Q. For what purpose is a column of fours reduced to a column of twos or files, and what is the rule regarding the execution of the movement? A. It is used only for the purpose of reducing the front of the column to enable it to pass a defile or other narrow place, after which the column of fours should be immediately re-formed. The movement is always executed toward the file-closers.

2047. Q. What is the distance between ranks in column of twos? A. Facing distance.

2048. Q. Explain briefly the manner of forming column of files from column of fours at a halt. A. At the command *Right by file*, the rear rank of each four closes to facing distance; at the command *March*, the right file of the leading file moves forward, followed in succession by the files on its left; when the left file of the leading four is about to commence to oblique, the right file of the second four moves to the front, and so on.

2049. Q. Can column of files be formed from column of fours while marching? A. Yes; the movement is executed the same as from a halt, except that the leading file continues the march; the others halt without coming to the order, and resume the march at the proper time.

2050. Q. In what *time* is the march to be made in column of twos or files? A. Always in quick time.

2051. Q. In facing a column of twos or files to the rear or to a flank to march a short distance, how do the officers and non-commissioned officers execute the movement? A. They face with the column and retain their positions.

2052. Q. In forming column of fours from column of twos or files, which men make the short step and which the oblique, and what rule applies to the execution of the movement? A. The leading two of each four make the short step and the rear two make the oblique. The movement is always executed away from the file-closers.

2053. Q. How is the column of fours formed from column of twos or files? A. At the command *March*, the leading file of the first four halts, the rear-rank man falling back to forty-four inches as soon as the file in rear has obliqued; the other files of the first four then oblique and place themselves successively on the left of the leading file; the other fours form as explained for the first.

#### PLATOON MOVEMENTS.

2054. Q. In movements by platoons, what should each chief do with reference to the commands? A. Each chief should repeat such commands as are to be immediately executed by his platoon, and should give them so as to insure the execution of movements by his platoon at the proper time.

2055. Q. What is the rule regarding the proper time for each

chief of subdivision taking his place in front of its centre? A. In column, whenever a subdivision is dressed, after commanding, *Front*; in movements where the subdivisions are not dressed, as soon as the column is formed.

2056. Q. The company being in line, by what movements may a column of platoons be formed? A. By executing *platoons right* (or *left*), in which case the column is formed to the right (or left), halted, and dressed; also by executing *right* (or *left*) *by platoons*, in which case the column is formed to the front, the right (or left) platoon moving straight to the front, and the other obliquing until its guide arrives in the trace of the first, when it is moved directly to the front.

2057. Q. At what particular time do the fourth and fifth sergeants place themselves as guides when a company is formed in column of platoons or line of platoons in column of fours, and when do they return to their posts? A. They place themselves as guides as soon as practicable, and return to the line of file-closers when the company unites in line or column of fours, unless they mark an alignment.

2058. Q. Where is the position of the captain in column of platoons? A. On the side of the guide, three paces from the flank of the column, abreast of the leading platoon.

2059. Q. If it is desired to form column of platoons to the right (or left) and move forward or to halt, what are the commands? A. To form to the right and halt the command is, *Platoons right, march*, while in the other case it would be, *Platoons right turn, forward, march*.

2060. Q. In changing direction in column of subdivisions, what is the duty of each chief regarding the guide? A. On the completion of the movement by his subdivision he announces the guide on the side it was previous to the turn.

2061. Q. In forming line from column of platoons, what is it necessary for the captain to do before forming it? A. He requires the guide of the second platoon on the flank toward which the movement is to be made to cover if at a halt; if marching, he announces the guide on that flank, if not already there.

2062. Q. In forming line to the right or left from column of platoons, how does each chief gain his place? A. By obliquing until he clears the marching flank, when he takes his post as a file-closer.

2063. Q. If it is desired to form line from column of platoons and continue the march, what is the command? A. *Platoons right* (or *left*) *turn, march*; *guide right* (or *left*), *forward, march*.

2064. Q. What is meant by forming line from column of platoons *on the right* (or *left*)? A. It is a movement by which the line is established by the leading platoon making a turn to the



right (or left) and the rear platoon passing beyond and turning at a point which will establish it in line on the furthestmost flank of the one which marks the line.

2065. Q. If at a halt in column of platoons right in front, and it is desired to form the company by the command *Form company, left oblique*, what command does each chief of platoon give, and how does he dress his platoon when halted? A. The chief of first platoon gives the command *Forward, guide right*, and the chief of the second *Left oblique*. They both dress their platoons to the right.

2066. Q. From what point would the captain superintend the alignment of a line formed to the *left front* from a column of platoons? A. From the right flank.

2067. Q. If marching, and it is desired to form line to the front from column of platoons, what is the difference of command from at a halt? A. If marching in quick time, the chief of the leading platoon simply commands, *Guide right (or left)*, and the movement is executed as from a halt; but if the command *Double time* be given, the captain announces the guide immediately after the command *March*. The chief of the leading platoon, however, cautions it to advance in quick time and commands, *Guide right (or left)*, while the chief of the second commands, *Double time*, and when his platoon is abreast of the leading platoon commands, *Quick time, march*.

2068. Q. What is meant by *line of platoons in column of fours*? A. It is a line formed by the leading four of each platoon marching by the flank in column of fours, with intervals sufficient between the leading fours to bring all the fours of each column into line.

2069. Q. By what commands may a line of platoons in column of fours be formed and advanced? A. *Platoons right (or left), forward; fours right (or left), march*.

2070. Q. How may a company be formed in line while marching in line of platoons in column of fours? A. By commanding, *Platoons right (or left) front into line, march; company halt, front*.

2071. Q. When should the command *Halt* be given in forming a company into line while marching in line of platoons in column of fours? A. It is given when the leading fours have advanced platoon distance.

2072. Q. Being in column of fours, how may a line of platoons in column of fours be formed to the front? A. By the command *Right (or left) front into line of platoons in column of fours, march*. The first platoon is marched platoon distance to the front and halted; the second executes *column half-right*, and, after gaining its interval, *column half-left*, and is halted abreast of the first platoon.

2073. Q. How is the column of fours formed into line of

platoons in column of fours on the right? A. By commanding, *On right into line of platoons in column of fours, march.* The first platoon executes column right, advances platoon distance and twelve paces, and is halted; the second is marched beyond the first and executes column right when opposite its place, and is halted abreast of the first platoon.

2074. Q. Can a column of platoons be formed to the front from a column of fours? A. Yes, by commanding, *Platoons right (or left) front into line, double time, march.*

2075. Q. When marching in route-step, and the command *Attention* is given, what is done with the pieces? A. They are brought to the right shoulder immediately.

2076. Q. What are the men permitted to do, if halted, while marching in route-step? A. They come to a rest at the order arms.

2077. Q. How may the officers carry their swords when not at *attention*? A. At will, or in the scabbard.

2078. Q. When the flanks become the centre, what change takes place in the posts of sergeants? A. The second and third sergeants take post in the line of file-closers prescribed for the fifth and fourth sergeants, each with his own platoon; the fourth and fifth sergeants take the posts prescribed for the third and second sergeants. The first sergeant always remains with the original first platoon.

#### SCHOOL OF THE BATTALION.

2079. Q. Who is the instructor in the School of the Battalion? A. The senior officer present.

2080. Q. What commands are repeated by the captains? A. Only those that are to be immediately executed, such as *Forward, Fours right, March, Halt*, etc. They do not repeat the major's commands in executing the manual, nor those which are not essential to the execution of a movement by their companies; as, *Deploy column*, etc.

2081. Q. When may the major have the companies execute movements in the School of the Company, and how are his wishes made known? A. When the formation will admit of the simultaneous execution of such movements, he prefixes the word *companies* (or *platoons*) to the commands therein prescribed.

2082. Q. Who is responsible for the instruction of the battalion? A. The major, who assembles the officers for theoretical and practical instruction.

2083. Q. Of how many companies may a battalion be composed? A. Not less than two, nor more than six.

2084. Q. Give diagram showing the arrangement in line of companies from two to six inclusive. A. (See diagram, par. 253, D. R.)

2085. Q. How are companies whose captains are absent posted in line? A. According to the relative rank of the officers present in command of them.

2086. Q. Does a company lose its place whose captain is absent for a few days only? A. Not necessarily. It retains its place unless otherwise directed.

2087. Q. How are companies designated in line and column, and does any change take place? A. In whatever direction the battalion faces, the companies are designated numerically from right to left in line and in line of columns, and from head to rear in column, *first, second*, etc.

2088. Q. How is the battalion separated into wings? A. The companies to the right of the centre of the battalion constitute the *right wing*, and those to the left the *left wing*.

2089. Q. What are the two companies nearest the centre termed? A. That to the right the *right centre company*, that to the left the *left centre company*.

2090. Q. In case of an uneven number of companies, where is the odd company placed? A. In the original right wing.

2091. Q. When a new formation necessitates a change of designation, when does that change take place? A. Upon the completion of the movement.

2092. Q. How do captains designate their companies? A. By using the letter designation, as, *Company A*, etc.

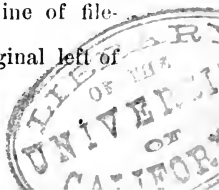
2093. Q. If a battalion is composed of fractions of several regiments, how are the companies arranged? A. The companies of each regiment are arranged according to the diagram given in the Drill Regulations; the fractions are then arranged in line from right to left, according to the rank of the senior officer present in each—the senior on the right.

2094. Q. Which is the color company if the color be with the battalion? A. The right centre company.

#### COLOR-GUARD.

2995. Q. How is the color-guard constituted, and where is its position with the battalion? A. It is composed of one sergeant, who is the color-bearer, and two experienced soldiers, selected by the colonel. In line, the color-bearer is between the guides of the right and left centre companies; the other members of the guard are in his rear, in the line of file-closers. The color-bearer takes the same position relative to the color company when in column at full distance or in mass. In column of fours the color-bearer is between the wings, abreast of the guide of the color company, in front or in rear of the file next the file-closers; the other members of the guard retain their places in the line of file-closers.

2096. Q. If by movements of the battalion the original left of



the color company is changed so as not to be the centre, what becomes of the colors? A. The color-bearer and guard will take post between the wings, either in line or column.

#### POSTS OF FIELD, STAFF, AND BAND.

2097. Q. Describe the positions of the field and staff in line.

A. The major is twenty paces in front of the centre of the battalion; the adjutant and sergeant-major are opposite the right and left of the battalion, six paces in rear of the file-closers; the staff officers, except the adjutant, in the order of rank, the senior on the right, one pace apart, six paces to the right, and in line with the front rank of the battalion. The non-commissioned staff officers, except the sergeant-major, take post similarly on the left of the front rank.

2098. Q. What is the position of the field and staff in column?

A. The major is on the side of the guide, twenty paces from and opposite the centre; the adjutant and sergeant-major on the side of the guide, opposite and six paces from the head and rear of the column respectively; the other staff and non-commissioned staff officers take post, in column of subdivisions, in their respective wings, on a line equal to the front of the column, in order of rank, the senior on the right, six paces in front of the captain of the leading company or six paces in rear of the file-closers of the rear company. In column of fours they take post similarly.

2099. Q. When the column faces to the rear, what is the position of the staff officers? A. They face about individually and maintain their relative positions.

2100. Q. What is the position of field and staff in line of columns? A. The major is twenty paces in front of the centre; the adjutant and sergeant-major are abreast of and six paces outside of the leading guides; the other staff officers are in the same relative order as in line, one pace to the right and left of the adjutant and sergeant-major respectively.

2101. Q. Should the line of columns face to the rear, what is the position of the field and staff? A. The staff and non-commissioned staff officers face about individually and move up abreast of the front rank or leading guides, keeping their relative positions.

2102. Q. How should a mounted officer face about? A. By habitually turning his horse to the left.

2103. Q. What is the position of the band and field-music? A. It is posted with the left of its front rank twenty-four paces to the right of the front rank of the battalion. In column, it marches with its rear rank twenty-four paces in front of the leading company, or its front rank twenty-four paces in rear of the rear company, according as the battalion is facing. In line of columns, it retains its line position, marching abreast of the lead-

ing guides. The field-music, except at inspection of companies, is posted in rear of and forms part of the band ; at inspection, they take post with their companies.

TO FORM THE BATTALION.

2104. Q. In the formation of a battalion, which is the first company to be posted on the line, and how should it be placed there? A. The right centre company. Its captain having moved forward at adjutant's call, should conduct his company so as to arrive from the rear, parallel to the line ; the right and left guides precede it on the line about twenty paces, taking post, facing each other, at order arms, under the direction of the adjutant and sergeant-major. When the company arrives near the line, the captain halts it, places himself facing to the front near the left guide and dresses the company to the left, commands, *Front*, and takes his post.

2105. Q. What is the general rule regarding the dressing of companies on the line by the captains? A. They should place themselves on the line on the flank toward which they dress, facing the front, and, after dressing the company, command, *Front*, and take their posts.

2106. Q. In the formation of a battalion, where does a non-commissioned officer in command of his company take post? A. On the right of the right guide at the command *Guides post*, and, except in formations for ceremonies, when the major commands, *Carry arms*, after receiving the report of the adjutant, he takes the post prescribed for the captain.

2107. Q. Should the band be stationed on the line of formation before sounding the adjutant's call? A. No ; it should take a position designated by the adjutant and march at the same time as the companies to the line.

2108. Q. After the line has been formed, what are the duties of the adjutant? A. When the last company arriving on the line is dressed, he commands, *Guides post* ; he then moves off at a trot, if mounted (if dismounted, in quick time), by the shortest line, to a point midway between the major and the centre of the battalion, faces the latter, and halts ; then faces the battalion, brings it to a carry and present, faces about, salutes the major and reports : *Sir, the battalion is formed*. After the salute is acknowledged by the major, he faces about, and returns around the right of the battalion to his post.

2109. Q. Can the battalion be formed in line in any other manner than on the right centre company? A. Yes ; it may be formed on the right or left company on the same principles as the centre.

2110. Q. Can the battalion ever be assembled in column of fours? A. Yes ; the companies are arranged in the same rela-

tive order as in line, and the adjutant reports to the major as soon as the last company has taken its place.

2111. Q. What is the usual and easiest way of equalizing a battalion? A. By transfers from one company to another before the battalion is formed.

2112. Q. In what other manner may a battalion be equalized than by transfer before it is formed? A. The major may form column of companies and direct the adjutant, first, to transfer men from the larger to the smaller companies; second, to break up one company and transfer the men to other companies; third, to form an additional company by taking men from the other companies.

#### OPENING AND CLOSING RANKS AND MANUAL.

2113. Q. In opening ranks, what does the major do after giving the command? A. At the command *Open ranks*, he goes to the right of the battalion; after the guides have placed themselves to mark the new line of the rear rank, he commands, *March*; then verifies the alignment of the officers and the ranks, gives the command *Front*, and takes post facing to the front, twenty paces in front of the centre of the battalion.

2114. Q. What are the duties of the adjutant in opening ranks? A. At the command *Open ranks*, he places himself, facing to the left, three paces in rear of the front rank, opposite the right of the battalion, and aligns the guides as they step back to mark the new line of the rear rank; at the command *March*, he verifies the alignment of the file-closers on the left file-closer; and at the command *Front*, he takes post three paces to the right of the battalion in line with the company officers.

2115. Q. In opening ranks, which guides step back to mark the new line of the rear rank, and when do they take their proper places? A. The right guides of each company; they take their places in the front rank at the command *Front*.

2116. Q. What becomes of the color-guard in opening ranks? A. The color-bearer remains in his place; the other members of the color-guard step back with the file-closers.

2117. Q. What are the duties of the drum-major in opening ranks? A. His duties are to see that the band takes three paces between ranks, and returns to his place in line at the command *Front*.

2118. Q. Should the battalion be faced about by fours when the ranks are opened, what is the duty of the sergeant-major? A. He performs the duties of the adjutant.

2119. Q. What is meant by the command *Close ranks, march*? A. To return the officers and men to the positions they occupied before the ranks were opened.

2120. Q. What is required of the color-guard during the exe-

cution of the manual of arms? A. They do not execute the loadings and firings; in rendering honors, they execute all the movements in the manual, and on drill, except when specially excused.

#### THE FIRINGS.

2121. Q. Where is the post of the major during the loadings and firings? A. Twenty paces in rear of the centre of the battalion.

2122. Q. After ceasing to fire, what command does the major give? A. *Posts*, when the captains return to their posts in line.

2123. Q. In the battalion firings, who designates the objective and number of volleys to be fired? A. The major.

2124. Q. To fire by company, what commands are given by the major? A. *Fire by company, one (two or three) volley, commence firing.*

2125. Q. What commands are given by the captains in firing by company? A. (Such) *company, at* (such an object), *at* (so many) *yards, company ready, aim, fire, load.*

2126. Q. Do all the companies fire at once? A. No; the odd-numbered companies fire first, and when the captain of each even-numbered company sees the pieces in the company on his right in the position of load, he gives the commands for firing; the captains of the odd-numbered companies conform to the same rules with regard to the even-numbered companies on their left.

2127. Q. By what means is the *fire by battalion* and *at will* executed? A. By the same command and means as in the squad, substituting *battalion* for *squad*.

#### MOVEMENTS.

2128. Q. What movements are executed by the battalion the same as by the company, by substituting *battalion* for *company*? A. The rests, resuming attention, and stacking and taking arms.

2129. Q. What is done at the command of the major, *Dismiss your companies*? A. Each captain conducts his company to its parade-ground, where it is dismissed as prescribed.

2130. Q. When a battalion is marching in line with *guide centre*, who is the guide? A. The left guide of the right centre company; he regulates the step and direction.

2131. Q. How do the companies dress at the command *Guide centre*, while marching in line? A. At that command the captains caution, *Guide left* (or *right*), according as they are in the right or left wing.

2132. Q. To make a slight change of direction while marching in line, what is required? A. The major commands, *Incline to*

*the right* (or *left*); and indicates the new direction. The guide gradually advances his left shoulder, giving time for the alignment to conform to his movement.

2133. Q. What line formation does the battalion habitually take in marching considerable distances? A. The line of columns of fours.

2134. Q. If marching in line, what difference is there in the command to face the battalion to the rear and the command to march to the rear? A. To simply face to the rear the command *Halt* must be given after the fours have wheeled about; to march to the rear the command *Guide centre* is given as the fours unite in line.

2135. Q. What becomes of the color-guard in an about movement while marching in line? A. The color-bearer turns about and takes his place in the front rank; the other members of the color-guard dart through to their places in the line of file-closers.

2136. Q. If the battalion be marched to the rear by the command *About face, forward, guide centre, march*, what becomes of the officers, file-closers, and guides? A. The officers, sergeant-major, and file-closers, upon facing about, remain in their relative positions; the guides step into the rear, now the front rank.

#### ALIGNMENTS.

2137. Q. What is meant by giving the battalion a general alignment? A. It is a line formed by a general movement under the direction of the major, who gives the command *Guides* (such) *company on the line*, and establishes the designated guides on the new line he wishes to give the battalion; he then commands, *Guides on the line*, when the guides of the other companies are posted as in forming the battalion; he then commands, *On the centre* (*right* or *left*) *dress*, when the base company first dresses up to the guides, and all others toward the base company.

2138. Q. What is a *base* company, and how is it designated? A. It is the company first established on the line, and is designated by the commands of the major for the *guides* (such) *company on the line*.

2139. Q. How may an alignment be corrected without the details of a general alignment? A. By the command of the major, *Captains, rectify the alignment*, when the captains dress their companies successively toward the centre, the centre companies dressing first, without waiting for each other.

2140. Q. If the new direction of the line be such that one or more companies find themselves in advance of it, or be oblique to, or at a considerable distance from, the battalion, what is done? A. If companies are in advance of the line, the major,



before establishing the guides, directs them to be moved to the rear; if at a distance from or oblique to the line, the captains conduct their companies so as to arrive parallel to the line, then halt and dress them.

2141. Q. What is the object of commanding, *Posts*? A. So that at that command the guides will return to their posts.

2142. Q. If obstacles occur in the line of march, is it necessary for the major to give any commands for the companies to pass them? A. No; captains will conduct their companies so as to pass obstacles with the greatest facility, and when passed resume the original formation.

2143. Q. In marching by the flank in column of fours, what distance must the leading guide of each company preserve between himself and the rear guide of the preceding company? A. All except the first maintains seventy-two inches.

2144. Q. To march a battalion a short distance to the right or left, must it be done by fours? A. No; if at a halt it can be done by simply facing it; or if on the march, by the commands *By the right (or left) flank, march*.

2145. Q. What is meant by breaking into column of fours, from the right or left, to march to the left or right, from being in line at a halt? A. The movement is to form column of fours and march parallel to the front of the battalion in line, each company breaking successively from the original line by the command of the captains, *Right (or left) forward, fours right (or left), march*, in time to join the column in the traces of the preceding company; the captain of the first company marching company distance to the front before he changes direction.

2146. Q. What movements may be executed by a battalion in column of fours the same as by a company, by substituting in the commands *battalion* for *company*? A. *Halts, advances, obliques, changes of direction, marches by the flank and to the rear, forming columns of twos and files, and re-forming in columns of twos and fours*.

2147. Q. In forming line to the right or left from column of fours, by what means is it determined if the march is to be continued in line? A. If the march is to be continued, the command *Guide centre* is given by the major as the fours unite in line; if not, the command *Halt* is given.

#### GENERAL RULES FOR SUCCESSIVE FORMATIONS.

2148. Q. What are successive formations? A. They include formations, either into line or column, in which the several subdivisions arrive in their places successively.

2149. Q. What is the duty of the adjutant or sergeant-major at the head of the column or nearest the point of rest with regard to guides in successive formations? A. In all successive forma-

tions, except formations by two movements, to post on the line opposite its right and left files, the two guides of the company first to arrive facing toward the point of rest ; if the formation be central, they are posted on the line in front of the leading company, facing each other.

2150. Q. When should the guides be posted for successive formations ? A. In all formations from a halt they are posted at the preparatory command indicating the direction ; if marching, they hasten toward the point of rest at the preparatory command, and are posted at the command *March*.

2151. Q. In the formations on right (or left) into line, how are the guides posted, and how in the formations front into line ? A. The first guide is posted company distance to the right (or left) of the head of the column, on right (or left) into line ; and in formations front into line, the guides are posted company distance in front of the head of the column.

2152. Q. How are the guides posted in the deployments ? A. They are posted against the leading company, in front of the head of the column.

2153. Q. How are the guides posted in changes of front ? A. The first is posted company distance to the right of the first or left of the fourth company, according as the change of front is to the right or left.

2154. Q. How is a line prolonged ? A. As in forming the battalion.

2155. Q. By whom are the guides assured position ? A. By the adjutant or sergeant-major nearest the point of rest, or by both if the formation be central.

2156. Q. When a line is to be formed facing to the rear, how are the guides posted ? A. They are posted so as to permit the leading company to pass between them, after which the second guide closes to a little less than company distance from the first. The same rule is followed by the guides of the other companies.

2157. Q. At the completion of all successive formations into line, what command does the major give ? A. *Guides post*.

2158. Q. In successive formations, if it be desirable to commence firing pending the completion of the movement, what is done ? A. The major instructs the captains as to the kind of fire, and the adjutant or sergeant-major at the head of the column cautions the guides not to take post marking the line.

2159. Q. In forming on right or left into line from column of fours, what commands do the captains give ? A. If from a halt, the first captain gives no command, but his company executes the movement ; the other captains give the command *Forward*, after which each gives the commands *On right into line* and *March*, when his leading four is nearly opposite its place in line. If marching, the captains of the companies in rear of the first omit the command *Forward*.

2160. Q. If marching in column of fours and an enemy appeared in front of the head of the column, what movements would soonest place the battalion in line for defense? A. *Right (or left) front into line.*

2161. Q. If the major commands, *Left front into line, march*, how does the second company execute the movement? A. The captain commands, *Forward, column left*, and conducts it opposite the right of its place in line, changes direction to the right, and commands, *Left front into line, double time, march*, when at company distance from the line.

2162. Q. What difference is there between the movement of the second and the other rear companies in coming left front into line? A. The captains give the command *Half-left*, conduct their companies to a point at twice company distance in rear of the right of their places in line, change direction half-right, and conform to what is explained for the second company.

2163. Q. What portion of the captain's command is omitted by the captains of the rear companies if the battalion be marching when left (or right) front into line is ordered? A. The command *Forward*.

2164. Q. How is *left front into line* faced to the rear executed? A. The same as left front into line, except that each captain marches his company beyond the line, wheels his company about by fours towards the point of rest, halts it and dresses it towards the point of rest.

2165. Q. In forming line by two movements from column of fours, when should the command *March* be given? A. As the head of an interior company is about to change direction.

2166. Q. What guides are established in forming line by two movements? A. Only those of the rear companies.

2167. Q. A part of a column having changed direction, what difference is made in the movement of companies between forming line to the *right, left, or faced to the right*? A. If the change of direction is to the right, and the line is to be formed to the left, the leading companies execute *fours left*, while the rear companies execute *left front into line*. If it is desired to form line faced to the right, the leading companies would execute *fours right*, while the rear companies would execute *left front into line faced to the rear*. If the column has changed direction to the left, to form line to the right the leading companies would execute *fours right*, and the rear companies, *right front into line*; and to form line to the left the leading companies would execute *fours left*, and the rear companies, *right front into line faced to the rear*.

2168. Q. Being in line, how may a column of companies be formed? A. If at a halt, by commanding, *Companies right (or left), march*; or to form column without halting, the command is, *Companies right (or left), turn, march, forward, march, guide right*

(or *left*), the command *Forward* to be given when all the companies have completed the turn.

2169. Q. What is meant by breaking by the *right* (or *left*) of companies to the rear into column? A. It is a movement by which a column of companies is formed in rear of the original battalion line, each company executing *fours right* (or *left*), *column right* (or *left*), the captains halting on the original line and permitting their companies to file past them, when they form line, are halted and dressed.

2170. Q. If marching in column of fours, how may a column of companies be successively formed to the right or left? A. By commanding, *Column of companies, first company fours right* (or *left*), *march, guide right* (or *left*), when the leading company executes *fours right* and the other companies continue the march in column of fours and successively form line to the right on the same ground as the first company.

2171. Q. If marching in column of companies at full distance, how may the companies be formed successively to the right or left into column of fours? A. By the command *Column of fours, first company fours right* (or *left*), *march*, when the leading company executes *fours right*; the other companies continue the march in column of companies, and execute *fours right* on the same ground as the first.

2172. Q. What is *full distance* in column of companies? A. It is company distance and three paces.

2173. Q. What are the commands of the captains in breaking by companies from the right (or left) to march to the left (or right)? A. At the preparatory command of the major for the movement the captain of the first company commands, *Forward, guide left*, and when the guide has advanced company distance commands, *Left turn, march*. The captains of the other companies give the same commands as the first in time to enter the column at full distance.

2174. Q. What is the command of the major and that of the captains for a column of companies marching at full distance to change direction? A. The major commands, *Column right* (or *left*); or, *Column half-right* (or *half-left*), *march*. The captain of the first company commands, *Right* (or *left*) *turn*, and when his company has executed that movement commands, *Forward, march*. The other subdivisions march squarely up to the turning-point, each chief adding *march* to the command *Right* (or *left*) *turn*, then the command *Forward, march*.

2175. Q. Being in column of companies at full distance, at a halt, what must be the difference in the commands in order to form line to the right or left, and halt or advance? A. To form line and halt the commands are, *Companies right* (or *left*), *march*; to form line and advance the commands are, *Companies right* (or *left*), *turn, march, guide centre, forward, march*.

2176. Q. What is meant by the command *Guides cover*? A. That command is given when some of the guides are not exactly in the trace of the leading guide, and when given it means that each guide should so correct his position that he cannot see any portion of any guide except the one immediately in front of him.

2177. Q. Marching in column of companies at full distance, what commands should be given to form line to the right, the right of the line resting opposite the head of the column? A. *On right into line, march*, the first company making a right turn at the command *March*, and the other companies continuing the column movement until opposite their places in line, when they execute the right turn.

2178. Q. Where is the guide during the movement on right into line? A. The guide is *right*.

2179. Q. What is the difference in the movements of forming front into line from column of companies and that of forming front into line from column of fours? A. From column of companies line is formed to the right front as follows: The first company moves straight to the front company distance and halts; the second company moves right forward, fours right until near the right of the first company, when it changes direction to the right, and then forms line by fours left; the other companies move by fours right, column half-left until opposite the right of the company preceding them on the line, when they change direction half-left, move up near the line, and complete the movement as prescribed for the second company. In forming line from column of fours to the right front, the first company is brought right front into line; the second, by fours right, moves company distance to the right and then changes direction to the left, and is brought right front into line before reaching the new line of the battalion; the other companies move by fours right column half-left twice company distance, and then follow what is prescribed for the second.

2180. Q. Being in line to meet an enemy appearing on the right flank, what movement would place the battalion in position the quickest to receive him? A. A change of front on first company, in which the first company executes a full *right turn*, while the other companies execute together a *right half-turn*, and when opposite their places in line each another *right half-turn*, and move up to the line.

2181. Q. Can a change of front be executed other than as described? A. Yes; by first forming a column of fours, and then front into line.

2182. Q. In route marches, where do the officers and non-commissioned staff officers march? A. The major, adjutant, and sergeant-major at the head of the column; the surgeon and hospital steward at the rear of the column; the other staff and non-

commissioned staff officers wherever the major directs ; the band in front of the leading company ; the captains at the head or rear of their companies, as directed by the major.

2183. Q. Being in line, what are the commands for advancing in line of companies in columns of fours? A. *Companies right (or left), forward, fours right (or left), march, guide (right, left, or centre).*

2184. Q. By what means is the line of columns of fours *put in march, halted, marched to the rear, and at the oblique*? A. By the same commands and means as the battalion in line.

2185. Q. How is ground gained to the right or left and front by a line of companies in columns of fours? A. By the command *Companies, column half-right (or left), march*, and the companies regulate their movements by those of the company toward which the movement is made, as when obliquing.

2186. Q. When is the guide again announced after a movement of this kind? A. When the direct march is resumed.

2187. Q. By what commands may a line of companies in column of fours change direction, and how is it executed? A. *Change direction to the right (or left), march, battalion halt*; or, *Guide (right, left, or centre)*. The first company changes direction to the right; the other companies are conducted by the shortest line to their places abreast of the first. If marching in double time, or in quick time and the command be double time, the captain of the first company cautions, *Quick time*; the other companies execute the movement in double time, and on arriving abreast of the first the captains command, *Quick time, march*.

2188. Q. Where is the guide in changing direction? A. During the movement he is on the side toward which the change is made.

2189. Q. If the command *Halt* be given during the execution of a change of direction by line of companies in columns of fours, what is done? A. Only those companies halt that have arrived in place; the others successively halt when they reach their places.

2190. Q. If the battalion be marching in a column of fours, how may it be formed front into line of companies in columns of fours? A. By the commands *Right (or left) front into line of companies in columns of fours, march*. The first company continues the march and is halted at company distance; the other companies move *column half-right*, and when they have gained their full intervals move *half-left* and halt abreast of the first company.

2191. Q. If marching in a column of fours, how is a line of companies in columns of fours formed on the right or left? A. By the commands *On right (or left) into line of companies in columns of fours, march*, when the first company executes column right, advances company distance and twelve paces in the new

direction, and halts; each of the other companies marches beyond the preceding one, and when opposite its place follows what is prescribed for the first company.

2192. Q. If marching in column of companies, what is the command for marching in line of companies in columns of fours? A. *Fours right (or left), march, guide (right, left, or centre).*

2193. Q. If advancing in line of companies in columns of fours, how are intervals extended and closed? A. To close intervals, by the commands *On (such) company close intervals, march, battalion halt*; or, *Guide (right, left, or centre).* The captain of the designated company cautions, *Continue the march*; the captains to the right command, *Column half-left*; those to the left, *Column half-right*. The designated company halts at the command *Halt*, and the other companies incline towards it until they gain the close interval, when they change direction half-right or half-left and halt on arriving abreast of the one designated. Intervals are extended, gaining ground to the front, on the same principles.

2194. Q. How may intervals be closed without gaining ground to the front in line of companies in columns of fours? A. The major wheels the battalion by fours into column of companies; the column is then closed on a designated company, and then wheeled by fours into line of columns of fours.

2195. Q. How may intervals be extended without gaining ground to the front? A. On the same principles as described for closing intervals without gaining ground; that is, wheeling by fours into close column, taking full distance, and wheeling again into line of columns of fours.

2196. Q. What is the distance between companies in close column? A. Eight paces.

2197. Q. What is prescribed for file-closers in close column? A. They close to one pace from the rear rank whenever a subdivision takes its place in close column, and fall back to two paces when the full distance is again taken.

2198. Q. How is a column of companies at full distance and at a halt closed in mass? A. The major commands, *Close in mass, guide right (or left), march*; the first company stands fast, all the others move up, and as each arrives at eight paces from the preceding one it is halted and dressed, each captain establishing the guide.

2199. Q. What difference occurs if the column be marching when ordered to close in mass? A. The major omits giving the guide; at the command *March*, the first company is halted; and the captains of the rear companies omit the commands *Forward, guide right (or left).*

2200. Q. If the command *Halt* be given during the movement of closing in mass in double time, must the entire column halt? A. No; only those companies that have closed to eight paces;

the others halt successively upon arriving at that distance from the preceding company.

2201. Q. How is the column closed in mass on the rearmost company? A. The major wheels the battalion about by fours, closes it on the same principles as prescribed for closing on the leading company, and when closed, wheels it about by fours again.

2202. Q. Being in close column, how is full distance taken from a halt and while marching? A. If at a halt, the major commands, *Take full distance, guide right (or left), march.* The captain of the first company commands, *Forward, guide right*; the captains of the other companies move forward by the same commands, adding *march* when they have full distance from the preceding company. If marching, the major omits giving the guide, and if in quick time, the captain of the rear companies halt them at the command *March* of the major, and put them in march when they have full distance. If marching in quick time and the command be *Double time*, the first company takes double time and the others continue in quick time until they have full distance, when double time is taken. If marching in double time, the first company advances in double time and the other companies take quick time until full distance is gained, when they resume double time.

2203. Q. How is a close column always played? A. With the designated or leading company in front.

2204. Q. If in line at a halt, and the command is given by the major, *Close column on first company, fours right, march*, how is the movement executed? A. The captain of the first company commands, *Forward, guide left*, advances his company twelve paces, halts and dresses it to the left; the other companies execute fours right. The captain of the second company halts in rear of the left of the first, and when his rear four passes him forms line to the left, halts it, establishes his guide eight paces in rear of the left guide of the first, and dresses to the left. The other companies incline to the right and move by the shortest line to their places in column, and execute what is prescribed for the second company.

2205. Q. What is done if close column is formed while marching? A. The first company will continue the march; the others wheel by fours to the right, enter the column, and when in the trace of the preceding company form line to the left.

2206. Q. By what commands is a column of fours played into close column, faced to the front? Describe the movement. A. *Close column, first company column right (or left), march.* The first company executes column right, and the leading guide having advanced twelve paces in the new direction, the captain halts, and as his rear four passes him forms line to the left, halts and dresses his company to the left; the other companies move



forward and execute the same movement eight paces in rear of the preceding company.

2207. Q. What is the difference in forming a column of fours into close column *faced to the rear* and that of *faced to the front*?

A. To face it to the rear, the major adds *faced to the rear* after *Close column*. The movement is executed as in faced to the front, except that the companies in rear of the first pass beyond it and enter the column in rear of the first, forming line to the right or left, according as the company changed direction to the right or left.

2208. Q. How may a column of fours ploy into close column faced to the right (or left)? A. By the commands, *Close column, first company, fours right (or left), march*. The first company executes the command, and the captain adds *guide right*, moves it eight paces, halts and dresses it to the right. The other companies form close column as prescribed from line.

2209. Q. If in close column and a change of direction is ordered by the flank, how do the companies obtain their new positions? A. The first company executes *right forward, fours right*, and as the rear four completes its wheel it is formed in line, to the right or left, halted, and dressed to the right or left. The other companies, after executing *fours right*, direct their march so as to enter the new column eight paces in rear of and form line as with the preceding company, the captain halting at the flank of the column and permitting his company to file past him.

2210. Q. How is a close column deployed from a halt? A. The major commands, *Deploy column, fours right (or left), march*. The first company stands fast by a caution from the captain, and is dressed to the left; the other companies execute *fours right*, and when each captain reaches three paces beyond the right of the preceding company wheels it by fours to the left, halts it near the line, and dresses it to the left. If marching, the first company halts at the command *march*.

#### MOVEMENTS BY PLATOONS.

2211. Q. What is the command for re-forming companies when in column of platoons? A. *Form companies, right (or left) oblique, march, battalion halt*; or, *Guide left (or right)*.

2212. Q. What is the exception if companies are formed from column of platoons while marching? A. The chiefs of the leading platoons do not halt them until the major commands, *Halt*.

2213. Q. What is a platoon column? A. It is a company in column of platoons.

2214. Q. What is a line of platoon columns? A. It is a line of companies formed in platoon column.

2215. Q. What is the full interval between companies in line of platoon columns? A. Platoon front and three paces.

2216. Q. How are the companies moved in closing intervals

while in line of platoon columns? A. The designated company stands fast and the other companies move by the flank toward it, inclining slightly to the rear, and when twelve paces from the preceding company is wheeled by fours to the front, halted, and dressed on the line of the designated company.

2217. Q. What is the command for advancing in line of platoon columns with full intervals from being in line? A. *Companies right (or left) by platoons, march, guide (right, left, or centre).*

2218. Q. If in line of platoon columns and it is desired to form column of companies to the right or left, what is the command? A. *Platoons (right or left) march.*

2219. Q. If marching in line of platoon columns and it is desired to form column of platoons to the right or left, what is the command? A. *Companies, column right (or left), march, guide (right, left, or centre).*

2220. Q. Being in column of platoons, how may the battalion be formed on right or left into line of platoon columns? A. The major commands, *On right (or left) into line of platoon columns.* The platoons of the first company change direction on the same ground, while those of the other companies pass platoon distance and three paces, and then follow what is prescribed for the first.

2221. Q. If in column of platoons, how may the battalion be formed front into line of platoon columns? A. By the command *Right (or left) front into line of platoon columns, march.* The first company advances in column of platoons and halts; the other companies by platoons execute *column half-right*, advance until the left of the first platoon is opposite its place in line, when direction is changed half-left, and the company is halted and dressed on the line of the preceding company.

2222. Q. If in column of fours, how may the battalion be formed front into line of platoon columns? A. By the same commands as when in columns of platoons. The first company executes *right front into line*; the second company executes *column right*, changes direction at the proper distance, and then, at platoon distance from the line, executes *platoons right front into line.* The only change with the other companies is that they execute *half-right* and move by the shortest line, when they follow what is prescribed for the second.

2223. Q. If in column of companies at full distance, how is a street column formed? A. By the command *Street column, march*, when the first company halts and stands fast; the second and third form in columns of fours four paces in rear of the right and left fours respectively of the first company, and the fourth company closes upon the second and third, the captains opposite the centre of their companies, together with all other officers and non-commissioned officers and the color-guard inside near their

posts in line or column. If but three companies in the battalion, the first and second platoons of the second company execute what is prescribed for the second and third companies. With five companies the platoons of the fourth company form in rear of the second and third companies; with six companies the fourth follows the second; and the fifth follows the third in their movements.

2224. Q. If in street column, how is a square formed? A. By the command *Form square, march*. The leading company halts or stands fast; the right and left flank companies wheel by fours to the right and left respectively and halt; the rear company executes about face.

2225. Q. If in street column and the command be given, *Column of companies, march, guide right (or left)*, how is it executed? A. The first company advances, the flank companies execute front into line in double time, each when at full distance from the preceding company, and the rear company advances when at full distance. Officers, guides, etc., return to their posts.

### EXTENDED ORDER.

#### GENERAL PRINCIPLES.

2226. Q. What is the basis of extended order? A. The squad.

2227. Q. What becomes of the men of a squad if the squad should be broken up, or the men belonging to it separated? A. They should place themselves under the orders of the nearest squad-leader, and serve with his squad, as if it were their own original squad.

2228. Q. When is an enemy said to be imaginary? A. When his position and force are merely assumed.

2229. Q. When is an enemy outlined? A. When his position and force are indicated by a few men.

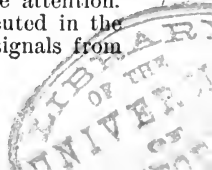
2230. Q. When is an enemy said to be represented? A. When a body of troops acting as such has its supposed force and position.

2231. Q. What formation are the troops required to be in to pass to extended order? A. Extended order may be taken from any formation.

2232. Q. What general rule is given regarding facing to the front in extended order? A. In arriving upon the line and upon halting, men will face to the front, whether in squads or as individual skirmishers.

2233. Q. Are any commands given for dressing in extended order? A. No; the general alignment is taken toward the base-file; the men stand and march at ease, but pay close attention.

2234. Q. By what means are the movements executed in the exercise in leading, and for what purpose? A. At signals from



the corporal, and as far as possible without commands or cautions ; in order to prepare the squad for the battle exercises by training the men to co-operate with their leader and conform instantly to his wishes.

2235. Q. In what way should the movements be executed ? A. In the most direct manner—first in quick time, then in double time, and finally at a run.

2236. Q. What is the position of the corporal ? A. Three paces in front of the squad.

2237. Q. Who is the guide of the squad ? A. The man in front of whom the corporal places himself, and he follows in the trace of the corporal at three paces.

2238. Q. How does the corporal direct the squad not to follow him ? A. He commands, *Guide right* (or *left*), and indicates the point of direction ; if marching by the flank he indicates the direction.

2239. Q. What is the position of the corporal when the squad is marched to the rear ? A. In front of the squad.

2240. Q. When is a squad deployed *forward*, and when by the flank ? A. It is deployed *forward* when it is in rear of the line to be occupied, and by the *flank* when it is already on that line.

2241. Q. Can a squad be deployed by the flank while marching ? A. No ; it is halted before deploying.

2242. Q. Can the squad be deployed forward from a halt ? A. No ; it must first be placed in march.

2243. Q. What is the normal interval between skirmishers ? A. Two paces ; if greater or less is desired, it must be stated in the preparatory command.

2244. Q. What must the corporal do before giving the commands for marching, deploying, or assembling, or for increasing or diminishing intervals ? A. He must indicate the file which is to be the base or guide, by placing himself in front of it.

2245. Q. On halting, where does the corporal go ? A. Three paces in rear of his squad.

2246. Q. In deploying as skirmishers, on what man is the deployment made, and how do the rear-rank men take position ? A. The deployment is made on the front-rank man of the second file from the right ; the rear-rank men place themselves on the right of their file-leaders, each as soon as there is interval.

2247. Q. If the squad is to kneel or lie down upon halting, how is this indicated ? A. The corporal gives the cautionary command *Kneel*, or *Lie down*, upon halting before giving the commands to deploy. The squad will then kneel or lie down at each halt until otherwise directed.

2248. Q. In deploying forward as skirmishers, how is the movement executed ? A. The front-rank man of the second file moves straight to the front, or in the direction indicated by the corporal ; the other men oblique to the right or left, according

as they are on the right or left of the second file, increasing the cadence, each resuming the direction and cadence of the guide when on the alignment at his proper interval. The rear-rank men follow, or precede their file-leaders on the line, according as they gain intervals to the right or left.

2249. Q. How is the deployment as skirmishers by the flank executed? A. The base stands fast; the other men move rapidly to the right or left, according as they are on his right or left.

2250. Q. In increasing or decreasing intervals, how is the movement executed, and on what point is the increase or diminishment made? A. If marching, the movement is executed by obliquing and increasing the cadence; if at a halt, the movement is executed by the flank. The skirmishers open from or close toward the base.

2251. Q. If the skirmishers be marching to the rear, how may they again be marched to the front? A. By the command *Forward, march.*

2252. Q. For what is the *rally* used? A. For immediate and concentrated action, when there is not time to form in the normal order.

2253. Q. Should a rally be made in rear of the line occupied? A. No; it should be either on the line or in advance of it.

2254. Q. How is a rally executed? A. The men run toward the corporal, and group themselves in any formation he directs, and fix bayonets.

2255. Q. If the corporal orders an assembly while on the march, how is it executed? A. The men move in double time, form and follow him; the men must not be assembled when faced or marching to the rear.

2256. Q. When skirmishers are so located as not to be able to see or hear the corporal, how do they regulate their movements? A. On the nearest men, who should transmit the commands to them in a low tone.

2257. Q. Who is the instructor of the platoon, and what is his duty before forming line of squads or deploying? A. The chief of the platoon is the instructor; he designates the centre squad of the firing line and indicates the point of direction to the leader of the base squad.

2258. Q. In forming line of squads or skirmishers, where do the chiefs of sections place themselves? A. At the preparatory command they place themselves in rear of their base squads in line, or abreast of them in column.

2259. Q. When and where do the corporals take post in forming line of squads or skirmishers? A. They take post in front of their squads in line at the preparatory command for forming line of squads; in deploying as skirmishers they take or keep their places in ranks, retaining supervision of their squads.

2260. Q. What part of a platoon forms the firing line? A. It

may be formed of one section, while the other forms the support, or the entire platoon may be placed in the firing line.

2261. Q. Give commands for forming line of squads, and diagram of same after the formation. A. *Line of squads on* (such) *squad, march.* (For diagram, see page 199, D. R.)

2262. Q. What is the normal interval between squads on the firing line? A. About fifteen paces.

2263. Q. Give diagram showing a platoon formed into line of squads from marching in line. A. (See page 199, D. R.)

2264. Q. If marching in double time, or in quick time and the command be *Double time*, how is the line of squads formed? A. The base squad advances in quick time; the others move in double time and take quick time on arriving on the line; the corporals keep their places in front of their squads.

2265. Q. If line of squads be ordered from a *halt*, how is it executed? A. The base squad stands fast; the others face and march away; each corporal halts his squad when it has gained its interval.

2266. Q. What is the command for forming line of squads to the front from column of fours, and how is it executed? A. *Right* (or *left*) *front into line of squads, march; platoon, halt.* The leading four moves straight to the front, the others move half-right (or left) by the shortest route until the proper interval is obtained, on the line of the leading squad.

2267. Q. How is a line of squads formed on right into line from column of fours? A. The leading four turns to the right at the command *March*; as soon as uncovered the second four moves obliquely by the shortest route to its proper interval on the line to the left of the first; as each successive squad becomes uncovered, it follows what is prescribed for the second.

2268. Q. If a platoon be deployed as skirmishers, how is the base squad determined and what man is the base skirmisher? A. The base squad must be designated in the commands of the chief, and number two of the front rank of such designated squad becomes the base skirmisher.

2269. Q. Is the deployment of a platoon made individually, or by squad? A. All the men of the line deploy on the base skirmisher, but the squad leaders direct the men of their squads in their individual movements.

2270. Q. If the platoon be deployed as skirmishers, how may it be assembled? A. In two ways: by a signal or the command *Assemble, march*, in which case it assembles individually on the chief of platoon wherever he may be; or by the command *Assemble by squads, march*, when the assembly is executed by squads.

2271. Q. What general rule governs the movements of a line of squads while marching? A. The squads conform promptly to the movements of the base squad.

2272. Q. If a considerable change of direction to the right or

left is desired in the march of a line squads, which is the base and what must it do? A. The squad on the flank towards which the change of direction is made becomes the base; it changes direction as if alone, and halts; the others conform to the new alignment.

2273. Q. How may the firings be executed by the platoon and section? A. They may be executed as explained for the squad by the platoon or section, whether closed or extended; volley firing may be used when the front is of such extent as to be controlled by the voice; to fire by section or squad the command given will indicate which, as well as the number of volleys to be fired; when desirable, the objective and range will also be given, and then the chief will add, *Commence firing*. Each section or squad executes the firings as if alone; the corporals take part in the firing except when the fire is by squad.

2274. Q. What is the normal interval between sections in line? A. Thirty-five paces between sections of two squads each and forty-five between sections of three squads each.

2275. Q. In reinforcing the firing line, where is the reinforcement placed? A. When there are intervals in the firing line, either on the outer flanks or between the groups, it is placed in these intervals.

2276. Q. How may the firing line be reinforced if at a halt or advancing under cover? A. The firing line may diminish intervals toward one flank, while the support deploys and moves up into the space made vacant.

2277. Q. How may the firing line be reinforced under a heavy fire? A. By deploying the support on the march, the support placing themselves on the line between the skirmishers.

2278. Q. When the firing line is reinforced, by whom is authority exercised in the line? A. Officers and non-commissioned officers take charge of their proportionate parts of the front, and the action progresses as if no mixing had taken place.

2279. Q. Should reinforcement of the firing line under a heavy fire be frequently resorted to? A. No; it should be used only when the emergency demands a prompt reinforcement above all other considerations.

2280. Q. How may platoons be *rallied*? A. Either by platoon, section, or squad; if by platoon, the simple command *Rally* is given or signal made; if otherwise, the chief designates as to the manner of making the rally.

#### THE COMPANY.

2281. Q. What is the battle formation of a company when part of a battalion and when acting alone? A. In battalion it is in two echelons—a firing line and a support; when acting alone it is in three echelons—a firing line, a support, and a reserve.

2282. Q. What is the distance between echelons in battle formation? A. They vary with the nature of the ground and the effectiveness of the enemy's fire.

2283. Q. What is the length of the fighting front of a company in battalion battle formation? A. Twice its front in close order.

2284. Q. On the defensive, how is the firing line constituted? A. Two sections constitute the firing line—one the support, and one the reserve.

2285. Q. What sections, as a rule, are designated for the firing line? A. The centre sections in line or the leading sections in column or line of columns.

#### POSITIONS AND DUTIES OF OFFICERS.

2286. Q. What is the position and duty of the captain in battle formation? A. He takes post between the firing line and the support, or, if the formation be in three echelons, near the support. He designates the sections for their various duties, directs the action of the whole company, controls the reinforcement of the firing line and keeps up the supply of ammunition, regulating distribution and expenditure. His orders, given by word of command, signals, or delivered by orderlies, are directed to the commanders of the firing line, support, or reserve. He keeps a musician with him.

2287. Q. What is the position and duty of a first lieutenant in battle formation? A. He is ten paces in front of and commands the reserve, if there be one; if not, the support, and maintains communication with the support and with the captain, sending forward men to act as messengers and repeat signals. When the whole company is in the firing line he commands his own platoon.

2288. Q. What is the position and duty of the second lieutenant in battle formation? A. He commands the firing line when it consists of only one section, or of one section from each platoon. If the firing line consists of an entire platoon, it is commanded by its own lieutenant, and the other commands the reserve or support. The commander of the firing line is ten paces in rear of it.

2289. Q. What is the duty of a commander acting alone before forming for attack or defense? A. He should make the reconnaissance necessary to determine the best disposition of his force, and should throw out scouts in his immediate vicinity, the number depending upon the nature of their duties and the extent and character of the front. These should be directed to convey information acquired by means of signals previously agreed upon.



THE COMPANY IN BATTALION ON THE OFFENSIVE.

2290. Q. At what point within the zone of fire should a company no longer advance in line? A. When artillery fire becomes effective—that is, on open ground about 2500 yards from the enemy.

2291. Q. How is a company in battalion formed for attack? A. Scouts are sent forward (usually from sections to be in support), a non-commissioned officer is designated to command them, the objective is indicated to him and to the chiefs of platoons; sections are designated for the firing line and support, and when the scouts have advanced about 150 yards to the front the captain commands, *Form for attack, march*. The second lieutenant designates the centre squad and commands, *Guide centre*. The first lieutenant commands, *First and fourth sections halt*.

2292. Q. Give diagram showing company formed for attack. A. (See page 208, D. R.)

2293. Q. When is the support of a company formed for attack placed in march? A. When the firing line has advanced about 200 yards.

2294. Q. At what distance should the firing line form line of sections, squads, and skirmishers? A. At 1400 yards forms line of sections; at 1200 yards line of squads; at 900 yards deploys as skirmishers.

2295. Q. What becomes of the scouts in advancing against an enemy? A. Whenever it becomes necessary, generally at 800 yards or less, the scouts should halt and wait for the firing line, and upon its arrival join the support, if detailed from that.

2296. Q. What movement should be adopted when within about 500 yards of the enemy's position? A. At this point alternate rushes will probably be necessary; the men should be lying down or behind cover, and the lieutenant commands, *Advance by rushes; third (or second) section, fire two (or three) volleys; second (or third) section, forward*. [The command *March* is not given in this movement.]

2297. Q. How are the *rushes* of a firing line conducted? A. The instant the first volley is fired by the third section, the chief of the second orders his section forward at double time, and advances about fifteen yards, or to cover if there be any, when he halts it and fires two (or three) volleys, kneeling or lying down. The instant of the delivery of the first volley by the second section, the third moves forward the same as prescribed for the second, halting about fifteen yards in advance of the second. This movement is repeated alternately.

2298. Q. When should the captain send forward the support to reinforce the firing line? A. As soon as it becomes necessary to increase the intensity of the fire during the period of attack by rushes.

2299. Q. In the attack by rushes, what part of the line should the support reinforce without indication? A. The sections of the support reinforce the sections of their own platoons, and take position so as to join in the next rush, and each lieutenant takes command of his own platoon, when the rushes may then be made by platoons.

2300. Q. Can a support reinforce the firing line without waiting for orders to do so? A. Yes; in emergencies the commander of the support may take the responsibility of moving it forward.

2301. Q. What does the captain do when preparing to make an assault? A. He selects favorable ground and commands, *Rapid fire*, at which platoon commanders order bayonets fixed, caution the men to lay down their sights, and command, *Rapid fire, kneeling; commence firing*.

2302. Q. What should any of the supports that are in rear do at the command *Rapid fire*? A. They should join the firing line at once.

2303. Q. How is the *charge* executed? A. When the charge is to be made the captain signals, *Cease firing*, and commands, *To the charge, march*, when the men rise and advance in double time; when within about thirty yards of the enemy's position the captain commands, *Charge*, when the men quicken their pace and charge upon the enemy with fixed bayonets.

2304. Q. What should the captain do if he drives the enemy or should be repulsed? A. If the enemy be driven from his position, he should select ground favorable for firing upon the retreating enemy, or for resisting a counter-attack. In case of repulse, he at once prepares to renew the attack.

2305. Q. How is a firing line relieved? A. The support deploys so as to complete the movement in rear of the line, and moves up into the intervals, or passes through the firing line, which is then marched to the rear and assembled. If the line be marching to the rear, the support is deployed, the firing line passes through the line thus formed, is assembled, and becomes the support, or part of it.

#### THE COMPANY ALONE ON THE OFFENSIVE.

2306. Q. What are the duties of the captain when conducting an attack with his company alone? A. He determines upon the direction and character of the attack, and indicates the rallying-point, and then conducts it on the principles explained for the company in battalion, with the exception that the firing line makes the front attack; the support reconnoitres, protects the flanks, and supports the front attack; the reserve, according to circumstances, makes a flank attack or participates in the front attack; and when the support is absorbed in the firing line the

reserve should advance so as to be about 150 yards from the firing line.

#### THE COMPANY IN BATTALION ON THE DEFENSIVE.

2307. Q. How is the company in battalion disposed for defense? A. The captain conducts it to the point selected, sends forward scouts to connect with those of adjacent companies, indicates to each subdivision the position it is to occupy and the defensive works to be constructed. Should the scouts cause the enemy to deploy and disclose his intentions, the captain orders the battle formation, and opens fire as soon as it can be made effective.

2308. Q. When should the support be habitually absorbed in the firing line while on the defensive? A. When the enemy arrives at about 500 yards from the position.

#### THE COMPANY ALONE ON THE DEFENSIVE.

2309. Q. What should be done if the company alone arrives at the position in battle formation or in order of march? A. If in battle formation, the firing line is established on the position to be defended; the support and reserve are placed under cover, and patrols are sent out to the front and on the flanks to reconnoitre. If in order of march, the advance-guard halts at the position and sends scouts and small patrols to the front and on the flanks, and the captain takes the battle formation, disposing the support and reserve so as to protect the flanks of the firing line; the supports, either wholly or in part, may be placed in the firing line from the beginning, but he should keep a portion of the reserve in hand for a counter-attack or to cover a retreat.

2310. Q. How should a retreat be conducted? A. The reserve is disposed in such position as to most readily hold the enemy in check, near one of the flanks if possible; the firing line unmask the reserve and takes position in rear of it; the reserve protects the retreat of the firing line and retires in turn under its protection.

#### ACTION AGAINST CAVALRY.

2311. Q. How should cavalry be kept at a distance? A. By means of volleys executed by subdivisions designated for the purpose.

2312. Q. How should a charge of cavalry be received if the company be in line and attacked in front? A. It should receive the charge without changing its formation. The advance or attack of infantry should, as a principle, never be checked by the appearance of cavalry.

2313. Q. What disposition is made if a company is attacked in flank? A. The company, or a part of it on the threatened flank, changes front to face the attack.

2314. Q. What dispositions should be made if the company be in battle formation and cavalry attack as foragers or in mass? A. If attacked in front, the firing line opens fire; the sections of the support are placed in the rear of the flanks to guard the latter and fire upon the horsemen who envelop them. If attacked in flank, the sections of the support and reserve face so as to find themselves arranged in echelon. If attacked by echelon, the fire will not be directed upon a fraction already repulsed, but upon the one following it. In a personal encounter the foot-soldier should gain the left flank of the horseman.

#### DEFENSE AND ATTACK OF ARTILLERY.

2315. Q. How should an infantry support defend artillery? A. By protecting the flanks and rear of the batteries, and oppose the enemy's infantry or cavalry acting against them; it is usually posted on the flanks.

2316. Q. How should infantry be disposed for the attack of artillery? A. As for the attack of a position, but the firing line may be deployed as skirmishers at a greater distance, and the front may be more extended; the rear echelons, if need be, are also deployed. If the artillery be in motion, the fire is directed preferably upon the horses.

#### THE BATTALION IN EXTENDED ORDER.

2317. Q. How is the battalion formed for battle? A. In three echelons—a firing line, support, and reserve.

2318. Q. What constitutes the *fighting line*? A. The firing line and the supports together.

2319. Q. Of how many companies may the fighting line consist? A. It may be composed of one, two, or even three companies.

2320. Q. Give the duties of the major connected with the extension of the battalion. A. He designates the company or companies to form the fighting line and those for the reserve, gives instructions for forming line of sections or squads, or deploying as skirmishers, indicates the point of direction and the object of the movement, and commands, *Form for attack*, (such) *the base company; march*.

2321. Q. Give diagram showing the battalion in extended order. A. (See page 216, D. R.)

2322. Q. When the extension is completed, what distance should there be between companies in the line of skirmishers? A. Fifteen paces, which should be preserved during the advance.

2323. Q. What is the extent of the fighting front of a battalion in regiment, and where is the reserve held? A. The front should not exceed one and one-half times the front of a battalion in close order. The reserve is held about three hundred yards in rear of the line of supports.

2324. Q. What is required of the major if he leaves the post designated for him? A. He should leave a man there to tell where he may be found.

2325. Q. Who commands the reserve of a battalion in extended order? A. The senior officer takes command only when the companies are united in close order.

2326. Q. What is required of mounted officers when the battalion opens fire? A. They must dismount and send their horses to the reserve.

2327. Q. What becomes of the color of the regiment when the battalion it is with takes the battle formation? A. It joins the regimental reserve, whose commander either directs it to join a certain company or detaches a guard to remain with it during the action.

2328. Q. How is the firing line of a battle relieved and reinforced? A. On the same principles as for a company, either as ordered by the major or in each company by its captain. Relieving skirmishers, however, is an exceptional movement.

2329. Q. What general rules govern the major when the battalion is in action? A. He exercises a general control, regulates the progress of the action, sees that the firing line advances towards the objective, hastens or delays reinforcement by the supports, disposes the reserve to guard against surprise, and indicates what measures are to be taken to secure the position; but should leave to each commander the discretion necessary to enable him to profit by all circumstances, and leave the execution of details to his subordinates.

2330. Q. What is required of the captains in the fighting line of a battalion in action? A. Each captain regulates the march of the line within the limits assigned him, determines the distance to be passed over in rushes, and brings his support on the firing line, pursuant to orders, or without orders if the necessities of the moment require; he also directs the fire and regulates its intensity.

#### THE BATTALION IN REGIMENT ON THE OFFENSIVE.

2331. Q. How is the attack made by a battalion in regiment? A. On the same principles as prescribed for a company.

2332. Q. Where should the reserve be when the firing line gets to within 500 yards of the enemy's position? A. The first echelon should draw near during the advance so as to be about 100 yards, and the second about 200 yards, in rear of the firing line.

2333. Q. At what point in the advance should bayonets be fixed and rapid fire opened? A. At about 200 yards from the enemy, at which time the last of the reserve in rear of the point at which the main effort is to be made is held in readiness to reinforce the line, and the battalion in the second line of the regiment draws nearer so as to replace the battalion reserve, if necessary, and take part in the charge.

2334. Q. What is done if the rapid fire does not shake the enemy? A. The remainder of the battalion reserve is quickly brought up and another rush made, followed by rapid fire; during this fire the battalion of the second line reinforces the firing line.

2335. Q. When should the whole line rush upon the enemy? A. When the field-music sounds the charge, at a signal from the colonel.

2336. Q. What is done if the line is repulsed? A. It rallies under the protection of the reserve.

#### THE BATTALION ACTING ALONE ON THE OFFENSIVE.

2337. Q. In what way is the battalion acting alone on the offensive different from acting with the regiment? A. The front may be more extended, and if the strength of the battalion warrants it, the major may attack both in front and flank.

#### THE BATTALION IN REGIMENT ON THE DEFENSIVE.

2338. Q. What is the battle formation for a battalion in regiment on the defensive? A. The same as on the offensive. The reconnaissance and occupation of the position are made on the principles explained for the company acting alone, under the protection of the patrols.

2339. Q. If it is desirable to have an extended and dense firing line from the start, what may be done? A. The two companies in the fighting line may be directed to keep but one section each in support. The same result may be obtained by placing three companies in the fighting line, each having two sections in support.

2340. Q. What rules govern in the selection of a line of defense? A. The configuration of the ground; the points that command a clear field of fire in front and afford cover should be strongly occupied; the different parts of the front should be able to assist each other, and should not be separated by impassable obstacles.

2341. Q. On what does the disposition of the rear echelons of the battalion depend? A. Upon the movements of the assailant. The supports are placed in the firing line in proportion to the necessities of the case.

2342. Q. What kind of fire should be used by troops in rear when firing over the heads of others? A. Volley fire only.

2343. Q. When may the firing line be reinforced by the entire reserve? A. In the last stage of the action.

2344. Q. If retreat becomes necessary, how is it accomplished? A. The same as for a company. If all the battalion reserves have been absorbed in the firing line the troops in the second line take position and protect the battalion while rallying, or by an energetic counter-attack endeavor to gain the ascendancy. If, in obedience to orders, resistance is not to be carried to the last extremity, the retreat is executed by echelons from position to position.

#### THE BATTALION ACTING ALONE ON THE DEFENSIVE.

2345. Q. When should the battalion deploy when acting alone on the defensive? A. Not until the enemy's position be known.

2346. Q. What conditions should be observed after the battalion has taken position preparatory to receiving an attack? A. The front must be sufficiently occupied and extended; this will usually require two companies in the fighting line; the other two companies are held in reserve in rear of the supports, covering the flanks and extending beyond them. When the supports have been absorbed they are replaced by the reserve companies, which are disposed so as to protect the flanks.

2347. Q. What may be the special objects of a battalion operating on the flank of a line? A. They may be to secure the flank, to envelop the enemy's flank, or to engage the enemy at one point while the regiment or brigade prepares and executes the principal attack at another point.

2348. Q. What rules should govern in a night attack upon an enemy in order to be successful? A. It should be a surprise; it should be prepared secretly, avoiding indications that might attract the attention of the enemy. Once engaged, it is necessary to act vigorously and promptly, and it is essential to operate over ground known in advance. The leaders of the different units should be carefully instructed as to the parts they are to take, the field assigned them, the rallying points, and the line of retreat.

2349. Q. In what formation should troops operate in a night attack, and how should the attack be conducted? A. The troops usually operate in compact formation, so as to be kept in hand and prevent misunderstandings. The assailant approaches in silence under cover of darkness, and, without firing, as near as possible to the enemy's position; he then assaults resolutely, not replying to the fire, and comes as quickly as possible to the encounter, hand to hand.

2350. Q. How should troops act on the defensive in a night

attack? A. If the night attack be expected, the position is reinforced by troops, or strengthened by obstacles or hasty intrenchments; the positions to be occupied by the different units are indicated and understood beforehand.

#### ADVANCE AND REAR GUARDS.

2351. Q. What is an *advance* and what a *rear guard*? A. An *advance-guard* is a body of troops thrown out in front of a marching column to cover its movements, to prevent surprise, and gain information. Rear-guards are corresponding bodies in rear of the column.

2352. Q. What are the duties of an advance-guard? A. In advance it seizes advantageous positions and holds them until the main body comes up, or holds in check the advancing enemy until the main body can deploy and take up a position to meet him. In retreat it prepares the way for the main body, guarding and repairing roads, bridges, etc., sweeping away partisans or guerillas.

2353. Q. How is an advance-guard divided and subdivided? A. It is divided into two nearly equal parts, the *vanguard* and the *reserve*. The vanguard is subdivided into the *advance party* and the *support*. The advance party furnishes the *leading* and *flanking* groups. The support furnishes its own *flankers*.

2354. Q. Give diagram showing an advance-guard on the march. A. (See page 232, D. R.)

2355. Q. What is the duty imposed on *rear-guards*? A. In a forward movement they protect the rear of the column from raiding parties or detachments, arrest stragglers, prevent pillaging, etc. In a retreat they cover the column, checking the enemy, and delaying him so as to insure the safety of the column.

2356. Q. What should be the strength of an advance and a rear guard in a forward movement? A. It varies from one eighth to one fourth of the whole force: in a very small force one eighth, in a very large force one fourth, and *generally* one sixth. The rear-guard is generally one half the strength of the advance-guard; but in retreat the proportions given for the advance-guard will apply to the rear-guard, and the advance-guard would be half the strength of the rear-guard.

#### OUTPOST DUTY.

2357. Q. What does the size of the detachment for outpost duty depend on? A. The strength of the main command, the proximity of the enemy, the extent of front to be covered, the character of the country, etc. It should not, as a rule, exceed one sixth of the whole force.

2358. Q. What is the object of having outposts? A. To guard



all approaches, to obtain the earliest information of the enemy's movements, and to obstruct and delay his advance.

2359. Q. How are outposts generally disposed? A. First, a line of sentinels; second, a line of small groups, called pickets; third, a line of larger troops, called supports; fourth, the reserve.

2360. Q. Give diagram showing the position of the officers and soldiers after being placed on outpost duty. A. (See page 235, D. R.)

### MARCHES.

2361. Q. What is the average march for infantry? A. From fifteen to twenty miles per day.

2362. Q. When troops move in large bodies, and particularly in the vicinity of the enemy, how should the march be conducted? A. In several columns, in order to diminish the depth of the columns and to expedite the deployment into line of battle.

2363. Q. What should the order of march state? A. The time for each division to commence its movement, and the points where the division or its elements should enter the main route, and also whether the troops or trains should have the right of way.

2364. Q. What portion of a command should be provided with pioneers; where do they march, and what are their duties? A. Each brigade is provided with a corps of pioneers; they should precede the column for the purpose of removing obstructions and preparing the way. Pioneers, mounted or in wagons, should repair the roads for the trains.

2365. Q. When should marches begin? A. When practicable, in the morning, after the men have had breakfast.

2366. Q. What period of rest should be given troops on the march during the day? A. After marching half or three quarters of an hour, a rest of fifteen minutes should be given; thereafter, ten minutes during each hour, except that on long marches halts of one half or three quarters of an hour should be made for meals, and this should be in the vicinity of wood and water.

2367. Q. How should a man obtain permission to leave the ranks on the march? A. Permission must be obtained from the captain; if a man needs medical attendance, the captain gives him a pass to the surgeon, showing his name, company, and regiment; if he is unable to return to his company, the surgeon admits him to the ambulance, or indorses the pass, stating that he is permitted to fall out on account of sickness.

2368. Q. Where does the provost-guard of a brigade march, and what are its duties? A. In rear of the brigade. Its duties are to examine men who fall out of ranks, and if absent

without authority they are arrested and sent to their regiments upon arriving in camp or bivouac.

2369. Q. When delays occur in front, how may the brigades be formed, and what is the duty of staff officers regarding the delay?

A. They may be formed in column of battalions and stack arms. Staff officers should investigate the cause of delay and report the same to their commanders. They should frequently be sent ahead during the march to gain any information that may shorten the march or lessen the fatigue of the troops.

#### CAMPING.

2370. Q. How should troops be placed in the presence of the enemy when halted for repose? A. They should bivouac in position; if safety permits, tents may be pitched in rear of the line of stacks, those of the company officers in rear of their companies—the field and staff in rear of the centre of the line of company officers.

2371. Q. How should troops be placed when not in the presence of the enemy when halted for repose? A. Usually in column of companies at convenient distances, the tents of companies being arranged in two lines, facing each other, or in one line all facing in the same direction.

2372. Q. Give diagram of a regimental camp. A. (See p. 238, D. R.)

2373. Q. What is the width of company or other streets of the camp? A. These vary with the nature of the ground and the strength of the command, and must be regulated by the commander.

2374. Q. What should be considered as good ground for camping? A. It should be susceptible of good drainage, and near wood and water.

2375. Q. What portions of the camp are ditched? A. All the streets, and a shallow one around each tent.

2376. Q. How may the number and frequency of camp diseases be greatly diminished? A. When straw, leaves, or boughs are at hand, the men should be required to raise their beds above the ground.

2377. Q. When and how should sinks be dug? A. On arriving in camp, if orders are not communicated for resuming the march the following morning. They should be concealed by bushes or tents, and should be covered daily with fresh earth.

## ADDITIONAL FOR FIRST LIEUTENANTS OF INFANTRY.

### EVOLUTIONS OF THE REGIMENT.

2378. Q. Of how many battalions does a regiment consist, and who is the instructor? A. Of three battalions, but the rules prescribed are applicable to a greater or less number. The colonel is the instructor.

2379. Q. Give diagram of a regiment in line, with positions of officers, etc., noted therein. A. (See page 139, D. R.)

2380. Q. What position does the lieutenant-colonel occupy in the various formations of the regiment? A. In line, in line of columns, or in line of masses, the lieutenant-colonel is posted on a line with the majors, opposite the right of the first battalion; in column, he is on the side of the guide, abreast of and twenty paces from the head; during field movements and on the march he is not restricted to any particular post—he acts as an assistant to the colonel as the latter may direct.

2381. Q. In route marches what are the positions of the colonel and staff? A. They march at the head of the column, the non-commissioned staff in their rear, or in rear of the mounted trumpeters and orderlies, the band in rear of the non-commissioned staff. The colonel may direct a surgeon to march in rear of the regiment, or one in rear of each battalion if there be a sufficient number.

2382. Q. How are the colonel's commands given? A. Orally, by the trumpet, or communicated by staff officers or orderlies.

2383. Q. What are the majors required to do concerning the commands of the colonel? A. Repeat them, unless otherwise directed, and add such commands and cause their battalions to execute such movements as may be necessary before the general movement. They also give commands necessary to insure the execution of the movements by their battalions at the proper time; and, after the general movement, add such commands as may be necessary to complete the movement in their battalions.

2384. Q. How may the colonel preface his commands? A. By commanding, *Battalions, attention.*

2385. Q. When the regiment is in more than one line, if a movement is to be executed by one of the lines, what is specified in the preparatory command of the colonel? A. He specifies, *First line, second line, or third line*, and the battalion commanders in the designated line repeat the commands.

2386. Q. When the formation will admit of the simultaneous execution of movements prescribed in the School of the Battalion, what will the colonel prefix to his commands? A. *Battalions.*

2387. Q. When the formation will admit of the simultaneous

execution of movements by companies or platoons, how are the movements executed, and who gives the commands? A. They are executed as in the School of the Battalion, and the colonel gives the commands prescribed for the major, except, in announcing the guide, in line, and in line of columns, he commands, (Such) *the base battalion*.

2388. Q. How may the colonel designate a battalion to execute a separate movement? A. By prefixing the command (Such) *battalion* to the commands prescribed in the School of the Battalion.

2389. Q. How may a regiment be formed? A. By battalions, in line, in line of platoon columns, or in line of masses; it may also be formed in separate lines in any of those formations.

2390. Q. At reviews and other forms of ceremony how are the battalions posted? A. From right to left, according to the rank of the battalion commanders present, the senior on the right; but a battalion whose major is in command of the regiment retains its place. On other occasions the battalions are posted as the colonel may direct.

2391. Q. What is the interval between battalions in line or in line of masses? A. Twenty-four paces.

2392. Q. How are the battalions of a regiment designated? A. In whatever direction the regiment faces they are designated from the right when in line and the head when in column, *First battalion*, *second battalion*, etc. If in two lines, the battalions in the first line are designated from the right, *First* and *second*; in the second line, *Third*, etc.

2393. Q. What is the method of forming a regiment? A. The adjutant indicates to the adjutant of the base battalion the point of rest and the direction of the line, then takes post facing the line, about 30 paces in front of the centre; the lieutenant-colonel and non-commissioned staff take post as the last battalion is formed; to receive the regiment the colonel takes post facing the line. The formation completed, the adjutant commands, *Battalions*, *attention*, presents the regiment to the colonel as explained for a battalion, and takes post with the colonel, passing by his right.

2394. Q. How are ranks opened and closed in the regiment? A. They are executed in each battalion, regulating on the first.

2395. Q. How are the firings conducted? A. By the battalion commanders, under direction of the colonel; the colonel, lieutenant-colonel, and staff pass to the rear of the line.

2396. Q. How is a regiment dismissed? A. The colonel commands, *Dismiss your battalions*, when each major conducts his battalion to its own parade-ground and dismisses it.

2397. Q. Being in line, how may the regiment be advanced? A. The colonel gives the commands prescribed in the School of the Battalion for advancing in line of columns, when the major

of the base battalion adds, *Guide centre* ; the other majors announce the guide toward the base battalion.

2398. Q. How may the regiment be advanced a short distance in line? A. The colonel commands : (Such) *the base battalion, forward, march* ; at the command *forward*, each major adds, *Guide centre*.

2399. Q. The regiment being halted, how may a general alignment be given? A. The colonel selects a base company from one of the battalions, posts its guides at the point of rest, and commands, *Guides on the line ; on the centre (right or left), dress*. The guides of each company post themselves as in forming a battalion, and each battalion is dressed as in battalion alignment. If a battalion be at considerable distance from or in front of the position it is to occupy, its major will at the first command move it to its proper position for dressing.

2400. Q. If in line at a halt, how may a column of fours be formed by breaking from the right to march to the left? A. By the same commands as for a battalion ; the first battalion executes the movement, and the other battalions follow successively at the commands of their majors, preserving the intervals between battalions.

2401. Q. In successive formations, what persons indicate the point of rest of each battalion? A. The adjutant and sergeant-major of each battalion ; they precede it on the line for that purpose.

2402. Q. What guides are first established on the line? A. The guides of the leading company of the base battalion.

2403. Q. How are the guides of the leading companies of the rear battalions established? A. Facing the point of rest of the general line, the nearest guide being twenty-four paces from the flank of the battalion next preceding.

2404. Q. What is the distance when forming two or more lines or column of battalions? A. The front of the battalion in line and twenty-four paces.

2405. Q. How is the second line of a regiment manœuvred when in two lines? A. It preserves its position relative to the first and conforms to its movements.

2406. Q. If marching in column of fours, how may two lines be formed to the right or left? A. By the commands *In two lines, fours right, third battalion second line ; march*. The first and second battalions form line to right ; third battalion inclines to left until the proper distance is gained, when it resumes original direction and forms line to right when its centre is opposite the centre of the other two battalions.

2407. Q. If it is desired to form column of fours again, what is the manœuvre of the second line? A. The battalion commander gives the command, *Fours right, march*, and moves it



by the shortest line to unite in column with the first line at the proper interval.

2408. Q. In forming on right or left into line in two lines from column of fours, how is the second line formed? A. If on right into line, the rear battalion inclines to the left until it gains its distance, when it resumes its original direction, and then forms on right into line in rear of the centre of the first line.

2409. Q. To form right or left front into line, what must the rear battalions do? A. The majors in rear of the first move their battalions column half-right (or left), so that when the head arrives opposite its point of rest it will be at least twice company distance in rear of the line when it changes direction half-left (or right), and on arriving at company distance the battalion executes right (or left) front into line.

2410. Q. How may a column of fours be formed *front into line* and *front into line faced to the rear* on the rear of the column? A. By first wheeling about by fours and then executing the movement designated.

2411. Q. How may a column of fours be formed front into line on the head of a rear battalion? A. The colonel commands, *On second (or such) battalion, right (or left) front into line; march.* The major of the first battalion wheels to the left by fours, moves twenty-four paces, wheels by fours to the left again, and then forms right front into line faced to the rear. The other two battalions simply perform the movement of right front into line. If the third battalion be designated, the second battalion executes the movements here described for the first, and the major of the first wheels his battalion about by fours, changes direction half-right, and forms his battalion on the left of the line, by right front into line faced to the rear.

2412. Q. From column of fours form front into line in two lines. A. The colonel commands, *In two lines, right (or left) front into line; third (or such) battalion, second line; march.* The first and second form right front into line, while the third inclines to the right and forms right front into line in rear of the centre of the first line. To form three lines—the third in close column of companies or in line of platoon columns,—the colonel sends special instructions to the major of third battalion and gives the commands to the other two.

2413. Q. If in column of fours, how is a line formed to the left by two movements? A. The same as by a battalion, except that the colonel uses the word *battalions* instead of *companies* in his commands; if he desires to form line to the right the rear battalions execute left front into line, faced to the rear.

2414. Q. Describe the formation of right and left front into line from column of fours. A. The colonel commands, *Right and left front into line; march.* The first battalion executes right front into line; the second and third are marched to the

left, and form left front into line—the second at twenty-four paces from the first, and the third the same distance from the second. If the command be *Left and right front into line*, the rear battalions execute right front and the first left front into line.

2415. Q. How is the movement executed of forming right and left front into line in two lines from column of fours? A. The first battalion forms right front and the second left front into line on the left of the first; the third forms line by two movements, and is established in rear of the centre of the first line. If the command be *Left and right*, the first battalion forms left and the second right front into line.

2416. Q. By what means may all movements in line of columns of fours, School of the Battalion, be executed by the regiment? A. By similar commands and means, the colonel designating (such) *battalion* when necessary.

2417. Q. Can the regiment, being in line, form column of companies or platoons to the right or left, or right or left of companies rear into column? A. Yes; by the commands and means prescribed in the School of the Battalion.

2418. Q. What movements may be executed from column of companies at full distance by the commands and means prescribed in the School of the Battalion? A. Advances, form line to the right or left, and marches to the rear.

2419. Q. What commands do the majors give when a column at full distance is ordered to face to the rear? A. They add, *Battalion, halt*, as the fours unite in line after wheeling about.

2420. Q. At what point should the rear battalions begin to execute the command *On right into line*, being in column at full distance? A. Each when its leading company is twenty-four paces beyond the left flank of the battalion preceding.

2421. Q. Being in column of companies at full distance, give commands of majors and describe the movement of right front into line. A. The majors of the two rear battalions command, *Fours right; companies, column half-left*, at the first command of the colonel. At the command *March* from him the first battalion executes the movement of right front into line; the other battalions march in the new direction, each until its leading guides are opposite the point of rest of the battalion, when the major commands, *Companies, column half-right, march; guide left*; and when the rear four of his left company is opposite the point of rest, commands, *Fours left, march; guide left*; and when at company distance from the line, forms his battalion right front into line on the right of the preceding battalion.

2422. Q. What is the interval between battalions at close intervals? A. Company front.

2423. Q. What rules govern the movements of battalions in forming column of masses from line? A. The designated bat-

talion ploys into close column ; the others play in rear of the one designated ; the battalion nearest the point of rest taking precedence in the column. The rear battalions are dressed to the same flank as the designated or leading battalion.

2424. Q. Give commands and describe movement of plying a line into column of masses. A. *Column of masses, on first company, first battalion ; march.* The first battalion ploys on its first company ; the others wheel by fours to the right, and each marches so that its leading company may enter the column at company distance and eight paces in rear of the rear company of the preceding battalion, the second in rear of the first. Should it be an interior battalion on which the ployment is made, the company and battalion will be designated by the colonel ; the major of the first battalion commands, *Fours left, march ; companies, column (left or right) ; march ; guide right*, and when his leading guides are opposite a point company distance and eight paces in rear of the second battalion, commands, *Companies, column (right or left), march*, and ploys in rear of the second ; the captains pass through the column, establish their guides, and dress to the left ; the captain of the first company announces *guide left* as his company forms line. The third ploys in rear of the first.

2425. Q. If the ployment into column of masses is made on the fourth company instead of the first of an interior battalion, in what positions are the battalions placed in column ? A. The third battalion ploys in rear of the second and the first in rear of the third.

2426. Q. What is the command for plying a column of fours into column of masses faced to the front ? A. *Column of masses ; first company, first battalion, column right (or left) ; march.*

2427. Q. If *column half-right* (or *left*) is given in the commands of the colonel, in the ployment from column of fours into column of masses, what does it signify ? A. That the column is to face in an oblique direction.

2428. Q. If, in the ployment of column of fours into column of masses, the colonel adds, *Faced to the rear* after *Column of masses*, how is it executed ? A. The leading battalion ploys faced to the rear on its first company ; the other battalions pass on, and each major gives his commands so that his first company may enter the column company distance beyond where the last company of the preceding battalion entered it.

2429. Q. What is the movement for the deployment of a column of fours into column of masses faced to the right ? A. The first battalion ploys faced to the right ; the other battalions incline to the left, each major giving his commands for the ployment of his battalion to the right in rear of the preceding one.

2430. Q. What movements may be made in column of masses by the same commands as when at full distance ? A. Advances,



halts, obliques, marches by the flank, resuming the march in column, facing to the rear, marches to the rear, and changes of direction on the march.

2431. Q. Being in column of masses, how is a change of direction by the flank executed? A. The leading battalion changes direction by the (right or left) flank; each of the other battalions wheels by fours, and is marched, with the guide right or left by two partial changes of direction, to its position in the new column, and then wheeled by fours. The partial changes of direction are executed in double time.

2432. Q. Describe the deployment of the regiment to the left from a column of masses. A. The first battalion deploys to the left; the second is marched in close column to its position on the line to the left of the first, and there deployed; the third is marched to its position to the left of the second and then deployed; the second and third battalions may be marched in column of fours to their places on the line.

2433. Q. How may a line be formed on the rear of the column from column of masses? A. The colonel first faces the column to the rear, and then the movement is executed as if deploying from the head of column.

2434. Q. How is the deployment made to the right and left from column of masses? A. The first battalion deploys to the right; the second and third deploy on the line—the second to the left of the first, and the third to the left of the second. If the colonel should command, *Left and right* instead of *Right and left*, the first battalion deploys to the left; the others deploy on the line—the second on the right of the first and the third on the right of the second.

2435. Q. Give the commands and describe the movement of deploying in two lines from column of masses. A. *In two lines, deploy column; third (or such) battalion, second line; fours right (or left), march.* The first battalion deploys to the right; the second deploys on the line of the first and to its right; the third moves in column of fours and forms line in rear of the centre of the first line. If the colonel commands, *Fours right and left*, the first battalion deploys to the right, the second to the left of the first; the third deploys to the left. If the command should be *Left and right*, the first deploys to the left, the second on line to its right, and the third deploys to the right.

2436. Q. Give the commands and describe the movement of plying into column of battalions from line. A. *Column of battalions, on first (or third) battalion; fours right (or left), march.* The first battalion stands fast; the second executes *fours right, column right*, marches the normal or specified distance to the rear, changes direction to the left and forms line to the left in rear of the first battalion. The third battalion executes *fours right, column half-right*, and forms in rear of the second.

2437. Q. What change is made if the column of battalions is formed on the second battalion from line? A. The second stands fast; the first executes fours left and forms in rear of the second; the third executes fours right and forms in rear of the first; the right guides cover.

2438. Q. How is a column of battalions faced to the *right* formed from column of fours? A. The colonel commands, *Column of battalions; first battalion, fours right (or left), march.* The first battalion forms line and is halted; the others incline to the left and form line in rear of the first, right guides covering.

2439. Q. How is a column of battalions faced to the *rear* formed from column of fours? A. The colonel commands, *Column of battalions faced to the rear; first battalion, column right (or left), march.* The first battalion changes direction to the right, and when its rear has cleared the flank of the column by twelve paces, forms line to the right and halts; the battalions in rear move forward, and each, when it has passed battalion distance and twenty-four paces beyond the preceding battalion, changes direction to the right and forms line, right guides covering.

2440. Q. Describe the movements of the battalions in forming front into line from column of battalions. A. If *right* front into line, the first battalion stands fast; the second forms line on the right of the first, and the third on the right of the second; but the colonel may direct the major of the third battalion to form it on the left of the second.

2441. Q. Where is the major's post in line of masses? A. Twelve paces in front of the centre of his first company.

2442. Q. Who posts the guides of the leading company in forming line of masses? A. The adjutant or the sergeant-major of each battalion.

2443. Q. Give commands and describe the formation of a line of masses on the first or third battalion from line. A. Commands, *Line of masses; on first company, first battalion; march.* The first battalion ploys on its first company; the second and third battalions move by the right, and each ploys with the interval of twenty-four paces from the left of the preceding battalion. If the formation be on an interior battalion, the colonel designates the first or fourth company, and the designated battalion ploys on that; the other battalions on the company nearest the point of rest, first closing, if not at the proper interval.

2444. Q. How may a column of fours be formed on right or left into line of masses? A. The major of first battalion gives command and moves his battalion column right, advances in new direction forty paces, and then commands, *Close column; first company, column left; march.* Each of the other battalions pass beyond the preceding one, and execute the same movement at their proper intervals.

2445. Q. How may a column of fours be formed front into line

in column of masses? A. The major of the first battalion commands, *Close column; first company, column right*, and the battalion plays faced to the front. The other battalion commanders move *column half-right*, march to the right front and execute the movement as the first.

2446. Q. In executing *right and left front* into line of masses from column of fours, how are the battalions ployed? A. The first battalion ploys to the right; the second and third to the left on a line with the first. If *Left and right* is given, the first ploys to the left, the others to the right.

2447. Q. Give commands and describe movement of forming front into line of masses faced to the rear from column of fours. A. Command, *Right front into line of masses faced to the rear, march*. The first battalion ploys faced to the rear; the others are moved column half-right and then half-left when they arrive at the proper intervals from the preceding battalion, after which they execute the movement the same as the first battalion and on a line with it.

2448. Q. In aligning a line of masses, what is required of the battalion and company commanders after the guides of the leading company of each battalion have been established on the line? A. The majors dress their battalions toward the point of rest; the first company of each battalion is dressed up to the guides; the captains of each of the other companies dress them at close distance.

2449. Q. Being in line of masses on the march, how is a change of front effected and by what command? A. *Change front on first (or third) battalion, march*. The first battalion moves column right, and when the first company has advanced forty paces the battalion is halted; the other battalions change direction half-right, and are so marched that by another change of direction half-right each may arrive on the line to the left of the preceding battalion.

2450. Q. Describe a change of direction by a line of masses marching by the flank in quick time. A. The leading battalion changes direction in double time, and the others at the commands of their majors change direction similarly on the same ground as the first.

2451. Q. What are the commands for forming column of fours from line of masses at a halt? A. *Column of fours; first company, first (or third) battalion, right (or left) forward, fours right; march*. Or, *First (or fourth) company, first battalion, fours right*. Or, *First (or fourth) company, third battalion, fours left; march*.

2452. Q. Give commands and describe movement of forming column of masses faced to the front from line of masses. A. The colonel commands, *Column of masses on first (or such) battalion; march*. The first battalion stands fast or is halted at the com-

mand *March*; the second is placed in close column in rear of the first, and the third in rear of the second. If the third be designated, the second moves in rear of the third. If the second be designated, the first takes position in rear of the second and the third in rear of the first. In this latter movement each major may manœuvre his battalion into position in mass or in column of fours.

2453. Q. Who indicates the point at which each battalion moves by the flank or changes direction to enter the column? A. The adjutant or sergeant-major of each battalion, according to flank.

2454. Q. In addition to the movement of changing direction by the flank, by battalion, by what commands can a column of masses be formed into line of masses to the right? A. *Forward, battalions, column right; march; battalions, halt;* or if the march is continued, (such) *the base battalion*.

2455. Q. In forming *on right into line of masses* from column of masses what kind of time is used in changing direction, and how far must the first battalion march before being halted? A. Double time must be ordered by the major in changing direction, and forty paces is the distance marched.

2456. Q. In the movement of *right front into line of masses* from column of masses, in what direction must the rear battalions move? A. They are moved in masses to their places, the second on the right of the first and the third on the right of the second. The colonel, however, may direct the major of the third battalion to form on the left of the first.

#### MOVEMENTS BY PLATOONS.

2457. Q. What is the interval between battalions in line of platoon columns? A. Platoon front and twenty-four paces.

2458. Q. What difference exists in the commands and execution of movements in column of platoons and line of platoon columns between the regiment and the battalion? A. They are the same, except the colonel designates (such) *battalion* when necessary.

2459. Q. In forming line or line of platoon columns, what must each major do? A. He must first move his battalion into position on the principles of forming line from column of fours, and at the proper time give the commands for forming line or line of platoon columns.

#### ORDER IN ECHELON.

2460. Q. The regiment being in line, at a halt, give commands and describe movement of advancing in echelon. A. Command, *Form echelon at (so many) yards; (such) the base battalion; march.* At the command designating the battalion the major of

the battalion commands, *Forward, guide centre*; the others caution, *Stand fast*. At the command *March* the designated battalion advances; the others take up the march, each when it has the specified distance from the one next preceding. A file-closer from each rear battalion marches at the specified distance directly in rear of the guide on the nearest flank of the preceding battalion, and each rear battalion marches abreast of and preserves the proper interval from the file-closer thus posted.

#### THE REGIMENT IN EXTENDED ORDER.

2461. Q. What principles apply to the regiment for extended order manœuvres? A. Those explained for the battalion.

2462. Q. When is a battalion in battle formation said to be in the fighting line? A. When it has any part in the firing line. The rule also applies to larger commands.

2463. Q. Upon what does the formation of the regiment in two or three lines for battle depend? A. Upon the extent of front to be occupied; but this should not exceed the front of the regiment in one line in close order increased by one half the interval between it and the adjacent regiments.

2464. Q. When in two or three lines, what portion of the regiment constitutes the fighting line? A. When in two lines, two battalions; the other is posted as a reserve. If in three lines, one forms the fighting line, one about six hundred and the other twelve hundred yards in rear.

2465. Q. How may the reserve be posted? A. It may be posted in rear of the centre, or in rear of one or both flanks.

2466. Q. Where does the colonel take post? A. Near the centre of the line of battalion reserves of the fighting line; if called elsewhere he indicates his position.

2467. Q. What are the majors required to do if the colonel fails to specify the formations for battalions in reserve? A. They adopt the formations they deem best suited to the ground and other circumstances.

#### ADDITIONAL FOR CAPTAINS OF INFANTRY.

##### THE BRIGADE.

2468. Q. Of how many regiments does the brigade consist? A. Three; but the rules prescribed are applicable to a greater or less number.

2469. Q. How are regiments in line and column designated? A. In line they are *right, centre, and left*; or if one be in rear, *right, left, and rear*. In column they are *leading, centre, and rear*.

2470. Q. In what order are the regiments posted? A. In the order of rank of the colonels from right to left, the senior on the right, unless otherwise directed. In two or three lines by regiments the senior is in the first line and the junior in the rear line. In column they are posted from head to rear, the senior at the head.

2471. Q. What is the interval between regiments in line? A. Forty-eight paces.

2472. Q. Where does the general take post? A. In line, 100 paces in front of the centre of the brigade; in column, at the head.

2473. Q. In moving into position, how should the regiments and battalions be habitually marched? A. In column of fours, and by the shortest practicable route.

2474. Q. When the general communicates his orders to regimental commanders through staff officers, what points should be covered by those orders? A. First, the manœuvre to be executed by the brigade. Second, the particular formation the regiment is to take, as *in two lines*, *line of masses*, etc. When the formation is not specified the regiment forms in line. Third, if formed in two or more lines, the orders should specify the number of lines, the distance between the lines, the line in which the regiment is to form, and its point of rest. When necessary, staff officers are sent to indicate the point of rest. Fourth, whether the right or left of the regiment is to connect with the left or right of another. Fifth, whether the right or left flank of the regiment will be exposed.

2475. Q. If it is desired to form front into line from column of fours, what orders must the general send? A. To each colonel, *The brigade to form front into line*; to the leading regiment, *Form right front into line*; to the centre regiment, *Form left front into line, your right connecting with left of leading regiment*; to the rear regiment, *Form right front into line, your left connecting with the right of leading regiment, right flank exposed*.

2476. Q. To form the brigade from column of fours into two or three lines, give orders and state how it is accomplished. A. The general sends orders, *Form in two (or three) lines to the right (or left)*, or adds *At (so many) paces distance*. The colonel of the leading regiment forms his regiment in two lines to the right and halts; the colonels of the rear regiments give the commands for forming in two lines each, when his first battalion has closed to forty-eight paces from the right flank of the first line of the regiment preceding it.

2477. Q. When forming in two lines, what should the colonel of the first regiment do regarding the distance he must take before forming line? A. He must advance the first line far

enough to allow the second or third line to clear the line of march.

2478. Q. How is a march to the rear conducted? A. The general sends orders, *March to the rear*, and designates the base battalion; each colonel causes the regiment to face to the rear, and gives preparatory commands to march in line. The *forward* is then sounded by orders of the general.

2479. Q. Being in line or line of columns, how is the march by the flank conducted? A. The general sends orders, *March by the right* (or *left*) *flank*. Each colonel wheels his regiment by fours to the right and halts it until the general causes *forward* to be sounded.

2480. Q. When at close interval in line of platoon columns, give commands and describe movement of re-forming line. A. The general sends orders, *Re-form line*, and designates the base battalion, the colonel of which causes it to take deploying intervals and form line; the other colonels cause their regiments to move by the flank until opposite their positions, then take deploying intervals and form line.

2481. Q. How are changes of front executed? A. By forming in column of fours and then forming front into line, or front into line faced to the rear. If in two or three lines, the simplest methods are used for moving the second and third lines to their new position.

#### THE DIVISION.

2482. Q. Of what does a division consist? A. Three brigades of infantry and two or more batteries of artillery. The rules prescribed are, however, applicable to a greater or less number.

2483. Q. What principles apply to the manœuvres of a division? A. Those prescribed for the evolutions of a brigade.

2484. Q. Where is the post of the division commander? A. He takes post 150 paces in front of the centre of the division in line, and at the head in column.

2485. Q. How are the brigades designated? A. In line, *right*, *centre*, and *left*; in column, *leading*, *centre*, and *rear*.

2486. Q. How are the brigades posted? A. According to the rank of brigade commanders as given in brigade drill, unless otherwise directed by the division commander.

2487. Q. What is the interval between brigades? A. Seventy-two paces, which is increased when an interval is left for artillery.

#### THE CORPS.

2488. Q. Of what does a corps consist? A. One or more regiments of cavalry and the corps artillery, which is in addition to the divisional artillery, and three divisions of infantry.

## THE BRIGADE IN BATTLE.

2489. Q. Upon what does the formation of a brigade in battle depend? A. Upon whether the brigade is acting alone or with other troops, and varies in each case to suit the extent and character of the front to be occupied.

2490. Q. If the brigade be formed for battle in one or two lines, what constitutes the fighting line of each regiment? A. If in one line, two battalions; the third forming the regimental reserve. If in two lines, the two leading regiments, and the second line constitutes the brigade reserve, and is posted six hundred yards in rear of the reserve battalions of the leading regiments.

2491. Q. If the brigade approaches the field of battle in column of fours, what may the general order with regard to the fighting line? A. He may order the leading regiments on the fighting line without regimental reserves, and supply a battalion from the rear regiment to each regiment in the fighting line as a reserve.

2492. Q. Under what circumstances should this latter method be resorted to? A. Only when a rapid extension of front is of the first importance.

2493. Q. What formation of the brigade may be made for a more powerful attack? A. The regiments may be formed side by side, each regiment in three lines, in which case the colonels will avoid calling on their second battalions prematurely; the third should not enter action without orders from the general.

2494. Q. What is the position of the general in battle formation? A. He has no fixed position, but will always indicate where reports will be received.

2495. Q. What should the general do if compelled to give an order to a battalion commander? A. He should inform the colonel of the regiment to which the battalion belongs as soon as practicable.

2496. Q. Is it absolutely necessary that a reserve should be posted in rear of the line? A. No; it may be formed advantageously in echelon with that line.

2497. Q. If the general desires to withdraw his brigade from the fighting line, what commands are given? A. He sends orders to the colonels, *Withdraw and form in one (or two) line on (such) battalion, (such) regiment*; or, *Withdraw and form in column on (such) battalion, (such) regiment*. The general indicates the position to be occupied by the designated battalion. If the order be to *form in column*, column of fours is understood, unless another formation is indicated.

## THE DIVISION IN BATTLE.

2498. Q. How may the division be formed for battle? A. With one or two brigades in the fighting line, and the others in reserve;



or the three brigades may be placed in the fighting line ; in either case, each brigade takes one of the formations prescribed for the brigade in battle.

2499. Q. What is required of the officers in command of the reserves ? A. They will adopt such formations as will not unnecessarily interfere with the manœuvres of the other arms.

2500. Q. Where may the reserve be posted ? A. It is not necessarily united ; the regiments and battalions composing it may be posted in rear of different parts of the first line.

#### OUTPOSTS.

2501. Q. Upon what does the size of the detachment for outpost duty depend ? A. Upon the strength of the main command, the proximity of the enemy, the extent of front to be covered, the character of the country, etc.; it should not, as a rule, exceed one sixth of the whole force.

2502. Q. What is the object of having outposts ? A. The object is to guard all approaches, to obtain the earliest information of the enemy's movements, and to obstruct and delay his advance. They should cover the entire front, extend well beyond the flanks and toward the rear.

2503. Q. What terms are used for the disposition of troops on outpost duty ? A. *First*, a line of sentinels ; *second*, a line of small groups, called pickets ; *third*, a line of larger groups, called supports ; *fourth*, the reserve.

2504. Q. Can the reserve be omitted on outpost duty ? A. Yes, when the supports hold a strong defensive line.

2505. Q. What is the distance between posts in the line of sentinels, and how many men at each post ? A. From one to three hundred yards apart. Two men at each post.

2506. Q. Where are the picket, support, and reserve posted ? A. The picket about 400 yards in rear of the centre of the line of sentinels for which it furnishes reliefs ; the support, 600 yards in rear of the centre of the line of pickets ; the reserve, 1000 yards in rear of the line of supports and about 2000 yards in front of the main body.

2507. Q. What must be impressed on sentinels regarding their duty ? A. They should keep themselves concealed, and watch the ground in their front and between them and the posts on their right and left ; at least one man on each post must always be on the alert.

2508. Q. Give diagram illustrating the disposition of troops on outpost duty. A. (See page 235, D. R.)

#### GENERAL RULES FOR CEREMONIES.

2509. Q. How are troops arranged on occasions of ceremony ? A. Except funeral escorts, they are arranged from right to left

in line and from head to rear in column as follows: *first*, infantry; *second*, light artillery; *third*, cavalry. Artillery serving as infantry is posted as infantry. Dismounted cavalry and marines are on the left of the infantry. Engineer troops on the right of any command to which attached. In the same arm, regulars, volunteers, and militia are posted in the order named.

2510. Q. When should the field and staff be mounted, and when dismounted? A. At parades and reviews the field and staff are habitually mounted; they are dismounted when the reviewing officer is dismounted.

2511. Q. What position will a non-commissioned officer in command of a company occupy on occasions of ceremony? A. He retains his post on the right of the right guide in line, and takes the post of the captain when in column. At parade, before bringing his company to parade rest, he steps two paces to the front and faces to the left, gives his commands and resumes his post on the right. At inspection, when ranks are open, his post is on the right of the right guide.

#### GENERAL RULES FOR REVIEWS.

2512. Q. What points will the adjutant or adjutant-general mark for the purpose of review? A. Men are posted or points otherwise marked where the column changes direction, in such manner that the right flank in passing shall be about twelve paces from the reviewing officer. A point is also marked about fifty paces to the left of the reviewing officer, to indicate where each company is brought to the carry at the command of its captain.

2513. Q. After coming to a carry for the reviewing officer, when should arms be brought to the right shoulder? A. After passing fifty paces beyond the reviewing officer.

2514. Q. What is required of the reviewing officer and all those accompanying him with regard to the colors? A. They should salute the colors by uncovering, whether the color salutes or not.

2515. Q. Who returns the salute of battalion and other commanders? A. The reviewing officer alone.

2516. Q. Where and in what order should the staff of the reviewing officer be placed? A. In single rank, six paces in rear of him, in the following order from right to left: chief of staff, adjutant-general, aids; then the other members of the staff in the order of their rank, the senior on the right.

2517. Q. What position should officers of the same or higher rank and distinguished personages occupy? A. On the left of the reviewing officer.

2518. Q. When should commanders of brigades and divisions take their places in the column? A. In time to allow the com-

manders in front of them to take their places when at one hundred yards from the reviewing officer.

2519. Q. Should the commanders of brigades, divisions, and corps draw swords when passing in review? A. Yes; they and their staff officers draw swords when they take their places in column before passing in review, and return them immediately after placing themselves on the right of the reviewing officer.

2520. Q. Where should the commander of a corps, division, brigade, or regiment, with his staff, place themselves when turning out of the column to be near the reviewing officer? A. On the right of the commanders already there; his staff will arrange themselves in single rank on the right of the staff already there.

2521. At what time does each commander leave the reviewing officer? A. When his rear company has passed; he salutes upon leaving.

2522. Q. When the reviewing officer is not in front or rear of a brigade, what is the commander permitted to do regarding the comfort of the troops? A. He may cause the brigade to stand at ease, rest, or stack arms and fall out, and resume attention so as not to interfere with the ceremony.

2523. Q. Are the commands of the brigade commander repeated? A. Yes, by the colonels.

2524. When the colonel faces the line to give commands, what should the majors do? A. They should face at the same time. All such commands are executed when repeated by the majors. After seeing the movement executed the majors resume their front.

2525. Q. If the command be *Present arms*, when should the field and staff salute? A. The battalion staff at command of the major; the colonel's staff at command of the colonel; the majors and colonel when they resume their front.

2526. Q. What is required of the bands during a review? A. The band of each regiment plays while the reviewing officer is passing in front and rear of the regiment. After passing the reviewing officer, it turns out of column and takes post in front of the reviewing officer, continues to play until its regiment has passed, then ceases playing and follows in rear of his regiment; the band of the next following regiment then commences. While marching in review, but one band in each brigade plays at a time, and but one band at a time when within one hundred paces of the reviewing officer.

2527. Q. Can the *present* in line and the ride around the line be dispensed with at review? A. Yes, if the ground be unfavorable or other conditions arise which make it necessary; in which case the post of the reviewing officer may be on the flank opposite the usual one, and the troops march with guide left instead of right—officers and non-commissioned officers changing flanks accordingly.

2528. Q. In reviews of divisions and corps, what is required of the battalions after passing the reviewing officer? A. Each battalion, after its rear has passed the reviewing officer fifty paces, takes the double time for one hundred paces, so as not to interfere with the march of the column; they then return to camp by the most practicable route, being careful not to interfere with the march of the troops in rear of them.

#### BATTALION REVIEW.

2529. Q. The battalion being in line at order arms for review, what commands will the major give? A. *Prepare for review; open ranks, march; front.* After seeing the movement executed he returns to his position in front of the battalion, and when the reviewing officer moves several paces towards him and halts, he faces about and commands, *Carry arms; present arms.*

2530. Q. After the reviewing officer acknowledges the presentation of the battalion, what are the duties of the major up to the point after passing the reviewing officer? A. The major faces about, brings the battalion to order arms, turns again to the front, sheathes his sword, and as the reviewing officer passes to the right of the line, joins him, salutes and takes post on his right, accompanying him around the battalion. When the reviewing officer leaves the right of the line to return to his post, the major takes post on his left, accompanies him a few paces, salutes, moves directly to his post, faces the battalion, draws sword and commands, *Close ranks, march; companies right, march.* The column being formed, he commands, *Pass in review; forward, guide right; march.* He takes his post in column immediately after the second change of direction. He salutes the reviewing officer when at six paces from him and returns to the carry at six paces beyond. He then takes post on the right of the reviewing officer, and remains there until the rear of his battalion has passed. He then rejoins his command.

2531. Q. What officers and non-commissioned officers salute the reviewing officer, and what salutes will the latter return? A. All officers, the non-commissioned staff, the drum-major, and non-commissioned officers in command of subdivisions salute the reviewing officer; he returns the salute of the major and the color, if entitled to a salute from it.

2532. Q. When should the band cease to play during a battalion review? A. When the column has completed its first change of direction after passing the reviewing officer.

2533. Q. In the event of the battalion being reviewed by an inspector junior in rank to the commanding officer, what is done? A. The commanding officer will receive the review and be accompanied by the inspector.

REGIMENTAL REVIEW.

2534. Q. How may the regiment be formed for review? A. In line, in line of platoon columns at close interval, or in line of masses.

2535. Q. In what way is a regimental review different from a battalion review? A. If formed in line, it is conducted on the same principles, the colonel giving commands and the majors of battalions executing them. He does not present the regiment until the reviewing officer halts some thirty paces in front of him. He accompanies the reviewing officer and his staff place themselves on the right of the staff of the reviewing officer, unless the latter advances alone, in which case the colonel alone accompanies him.

2536. Q. What positions do the field officers occupy in the review of a regiment? A. The column having been formed, each major takes post six paces in front of his staff, the lieutenant-colonel six paces to the right of the column abreast of the major of the first battalion, and the colonel places himself twenty-four paces in front of the band when the head of the column has made its second change of direction. The majors do not turn out of the column after passing the reviewing officer.

2537. Q. What modifications of the rules for a regimental review in line are required for a review in line of platoon columns? A. Ranks are not opened. The colonel commands, *Prepare for review*, and faces to the front. When the reviewing officer has passed around the regiment the colonel commands, *Platoons right; march*. The column having been formed, the colonel commands, *Pass in review; take full distance; guide right; march*. Each company moves off when it has full distance from the preceding one, and the majors enter the column when all of their companies have full distance.

2538. Q. How is the review conducted in line of masses? A. The same as in line of platoon columns, except that to form column for passing in review the colonel commands, *Battalions, change direction by the left flank; march*.

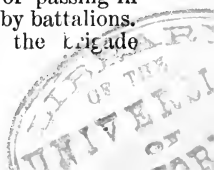
BRIGADE REVIEW.

2539. Q. How is a brigade formed for review? A. In line of masses with an interval of sixty paces between regiments, the brigade commander taking post thirty paces in front of the line of colonels.

2540. Q. Should the colonels accompany the reviewing officer? A. No; they remain faced to the front.

2541. Q. By what means is the column formed for passing in review? A. By changing direction by the left flank by battalions.

2542. Q. In passing in review, where should the brigade



commander be? A. The brigade commander takes post twenty-four paces in front of the leading colonel when at one hundred paces from the reviewing officer.

2543. Q. What officers leave the column to place themselves on the right of the reviewing officer in brigade review? A. The brigade commander and colonels.

#### DIVISION REVIEW.

2544. Q. How is the division formed for review? A. In one, two, or three lines of masses.

2545. Q. How is a division review conducted? A. Upon the arrival of the reviewing officer, the general commanding the division joins him and causes *attention* to be sounded, which is taken up in the right brigade of the first line. If in one line, the reviewing officer receives the salute of each brigade when he arrives at its right, except when he approaches a brigade from its left or front; in that case he receives the salute as prescribed for brigade review. Each brigade commander salutes, facing to the front, then faces his brigade and brings it to order arms and remains at his post. After the reviewing officer has passed around the division, the commander of the right brigade forms it in column, and when *forward* is sounded gives the commands for passing in review. Each of the other brigade commanders follows the movements of the first brigade at a distance of one hundred paces from it.

#### CORPS REVIEW.

2546. Q. How is the corps formed for review? A. In one, two, or three lines, with each division in a single line of masses.

2547. Q. What modifications of the rules for a division review are necessary for that of a corps? A. The same rules apply, except that each division commander accompanies the reviewing officer while passing in front and rear of his division, and then remains near the right of his division. The artillery of the corps is reviewed as prescribed in the Drill Regulations for Artillery.

#### BATTALION INSPECTION.

2548. Q. The battalion being in column of companies at full distance, what are the commands of the major and how is the battalion prepared for inspection? A. The major commands, *Prepare for inspection; march*. At the preparatory command the captains command, *Open ranks*. The field musicians join their companies; the drum-major conducts the band to its position in rear of the column, if not already there, and opens ranks;

the staff officers form a line equal to the front of the column fifteen paces in front of the leading company, the adjutant on the right, the others in order of rank from right to left; the non-commissioned staff form in similar manner three paces in rear of the staff, the sergeant-major on the right; the color guard, in one rank, marches to the front and takes post three paces in rear of the centre of the line of non-commissioned staff; the major takes post in front of the centre of the column six paces in front of the staff.

2549. Q. When the field and staff are inspected, what command does the major give? A. *Rest*.

2550. Q. What command does each captain give as the inspector approaches him? A. *Company attention; inspection arms*.

2551. Q. What command does the captain give after the inspection of the arms and ammunition? A. He orders the ranks closed, stacks arms, and reopens ranks, then commands, *Unslung knapsacks; open knapsacks*; and when the inspection of them is completed, closes and slings knapsacks, closes ranks, takes arms, and on intimation from the inspector marches the company to its quarters.

2552. Q. How is the band inspected? A. The adjutant commands, *Inspection instruments*; and each man, as the inspector approaches him, raises his instrument in front of the body, reverses it so as to show both sides, and then returns it to its former position.

2553. Q. How is the inspection of quarters conducted? A. The men, without accoutrements, stand uncovered, in front of their respective bunks; in camp they stand covered, without accoutrements, in front of their tents; the senior non-commissioned officer, upon the approach of the inspector, commands, *Company (or squad) attention*, when the men come to attention, but do not salute.

#### REGIMENTAL INSPECTION.

2554. Q. Wherein differ the rules for the inspection of a regiment from those for a battalion? A. The commands and means are the same; but the staff officers of the colonel form as the battalion staff fifteen paces in front of the major of the first battalion; the colonel is opposite the centre of the column, six paces in front of his staff, the lieutenant-colonel four paces to his left.

2555. Q. What should each major do with regard to the comfort of the men under him while on review? A. As soon as the inspector leaves it, he brings his battalion to a rest.

2556. Q. Who accompanies the inspector in a regimental inspection? A. Each major with his staff officers accompanies the inspector through his battalion.

## MUSTER.

2557. Q. What is meant by a muster of the troops? A. It is a proceeding in which the names of all men of a command are called from a roll of the company to prepare them for pay.

2558. Q. What ceremony generally precedes muster? A. It is preceded by an inspection, and whenever practicable, by a review.

2559. Q. How is the muster conducted? A. Being in column of companies at open ranks, each captain, as the mustering officer approaches him, brings his company to right shoulder arms and commands, *Attention to muster*. The mustering officer or captain then calls the names on the roll; each man, as his name is called, answers "here," and brings his piece to order arms.

## ESCORT OF THE COLOR.

2560. Q. What company should be sent to escort the color? A. Any one other than the color company.

2561. Q. How is the escort formed? A. In column of platoons, the band in front, the color-bearer between the platoons. Marching without music to the colonel's office or quarters, it is formed in line facing the entrance, and halted, with the band on the right, the color-bearer in the line of file-closers.

2562. Q. How are the colors obtained from the house? A. The color-bearer, preceded by the first-lieutenant, and followed by a sergeant of the escort, then goes to the house or tent, when the colors are delivered to the color-bearer. On coming out of the quarters, the color-bearer, followed by the lieutenant and sergeant, halts before the entrance, facing the escort; the lieutenant places himself on the right and the sergeant on the left of the color-bearer; the escort presents arms, and the field-music sounds *to the color*.

2563. Q. How are the colors delivered to the regiment? A. In quick time; the band playing the march of the escort is so conducted that when the escort arrives at fifty paces in front of the right of the regiment, the direction of the march shall be parallel to its front; when the color arrives opposite its place in line, the escort is formed in line to the left and halted; the color-bearer, passing between the platoons, advances and halts twelve paces in front of the colonel; the colonel faces the regiment, brings it to a present arms, resumes his front and salutes; the field music sounds *to the color*, and the color-bearer returns the color salute; the colonel then brings the regiment to a carry, after which the color-bearer takes his post with the color company.

2564. Q. How is the color returned to the colonel's quarters? A. It is escorted from the parade-ground of the color company by the color-guard.



ESCORTS OF HONOR.

2565. Q. What are escorts of honor? A. They are detailed for the purpose of receiving and escorting personages of high rank, civil or military.

2566. Q. How is the escort of honor formed? A. In line, opposite the place where the personage presents himself, the band on the flank of the escort toward which it will march. After receiving the personage with the honors due, the escort is formed in columns of companies, platoons or fours, the personage and his staff or retinue taking position in rear of the column.

2567. Q. When the position of the escort is at considerable distance from the point where the personage is to be received, what is done? A. A double line of sentinels is posted from that point to the escort, facing inward; the sentinels successively salute as he passes, and are then relieved and join the escort; an officer is appointed to attend him, to bear such communications as he may have to make to the commander of the escort.

FUNERAL ESCORTS.

2568. Q. How is a funeral escort formed? A. It is formed opposite the tent or quarters of the deceased, the band on that flank of the escort toward which it is to march. After the coffin is carried to that flank opposite the music, the escort is formed into column of companies, platoons, or fours. If the escort be small, it may be marched in line.

2569. Q. How is the funeral procession formed? A. In the following order: 1, Music; 2, Escort; 3, Clergy; 4, Coffin and Pall-bearers; 5, Mourners; 6, Members of the former command of the deceased; 7, Other officers and enlisted men; 8, Distinguished persons; 9, Delegations; 10, Societies; 11, Civilians.

2570. Q. What are the ceremonies of the escort at the grave? A. When the coffin is placed over the grave, the escort is brought to a parade rest, and when the funeral exercises are completed and the coffin lowered into the grave, the commander causes the escort to resume attention and fires three rounds of blank cartridges; a trumpeter then sounds *taps*.

2571. Q. At the funeral of a mounted officer or enlisted man, what follows the hearse? A. His horse, in mourning caparison.



## PART VIII.

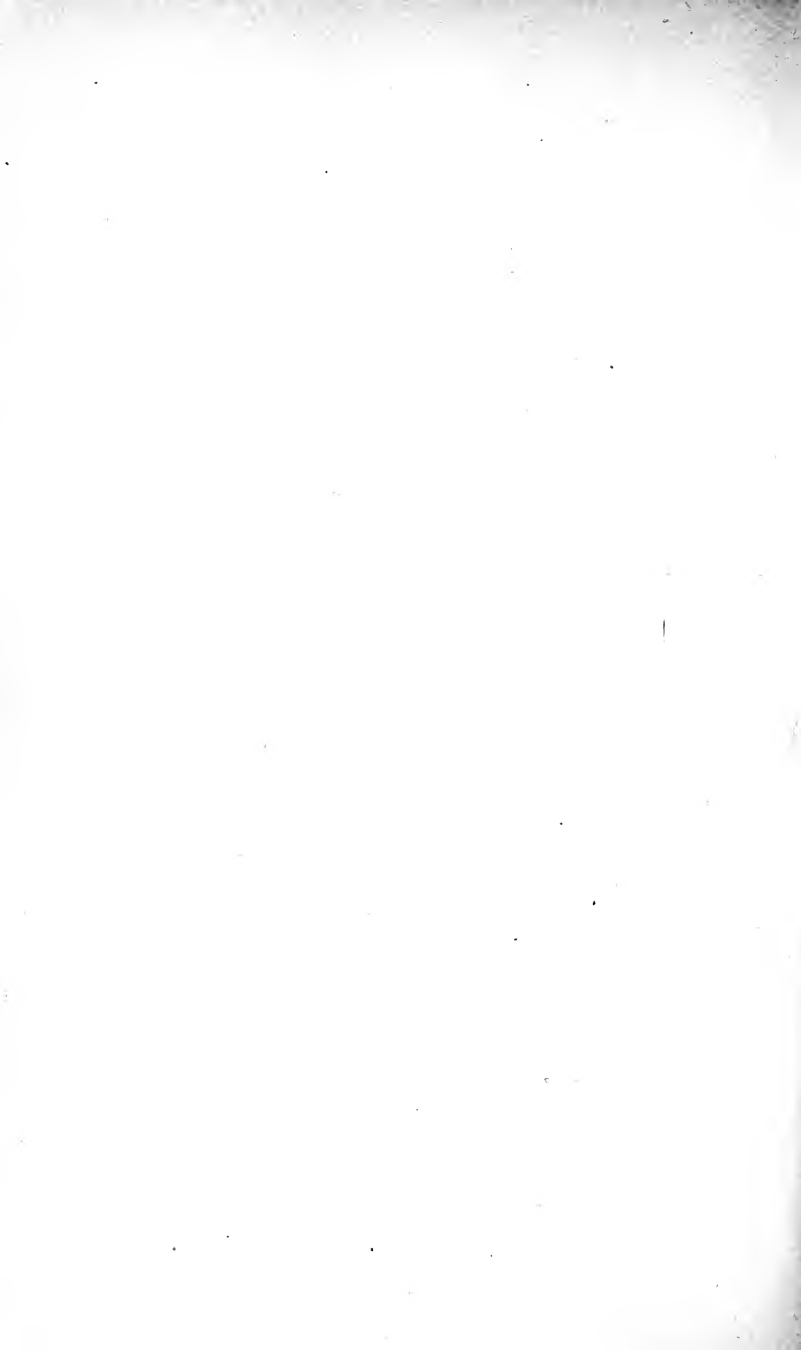
### *HIPPOLOGY.*

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TEXT-BOOKS: { *Fitzwygram's "Horses and Stables."*  
                  { *Dwyer's "Seats and Saddles."*

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FOR SECOND LIEUTENANTS OF CAVALRY—Nos. 2572-2975.  
FOR FIRST LIEUTENANTS OF CAVALRY—Nos. 2572-2975.  
FOR CAPTAINS OF THE Q. M. DEPT.—Nos. 2572-3079.



## PART VIII.

### *HIPPOLOGY.*

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#### HORSES AND STABLES.

##### VENTILATION AND CONSTRUCTION OF STABLES.

2572. Q. Of what importance is pure air in the stable? A. Pure air is as important to the integrity of the blood as wholesome food to the maintenance of the body.

2573. Q. Describe briefly the circulation of the blood. A. By each contraction or beat of the heart bright scarlet, highly vitalized blood, fresh from the lungs, is forced through the arteries to all parts of the body. The arteries dividing and subdividing become smaller and smaller, and ultimately terminate in very minute, hair-like tubes, called capillary vessels or capillaries. These vessels abound in every vascular structure, and from them each structure absorbs those special nutrient particles which are required for its growth or repair. In the capillaries the arterial or outward-bound system of the circulation ends. In these same capillaries the venous or return circulation commences. Into them also are returned the waste and used-up products of the system. Reversing the previous order, the capillary veins now enlarge and coalesce, and carry back to the heart dark, purple, venous blood, charged with waste matters of the tissues, and among these with carbonic-acid gas. The impure blood thus brought back by the veins is carried to the right side of the heart, and thence at each contraction or beat of that organ is forced into the lungs. The lungs contain an infinite number of cells, which through the bronchiæ and windpipe communicate with the outer air. On the outside of these cells the blood-vessels are spread. The blood thus exposed to the air takes up from it a portion of its oxygen, and gives off the carbonic-acid gas, and various volatile organic matters which have accumulated in it, as described above. Thus freed from impurity, and containing more oxygen, the blood again becomes scarlet, and adapted for the

nutrition of the body, and in this state it is returned to the left side of the heart for renewed circulation through the frame.

2574. Q. What is the effect of breath on the air? A. Air which has been much breathed in contains too little oxygen and too much carbonic-acid gas, and is, besides, loaded with organic impurities given off by the lungs and also by the skin.

2575. Q. Upon what does the condition of the blood and health of the animal depend in regard to the air supplied to it? A. It depends very much on the purity of the air supplied to the lungs.

2576. Q. What is the composition of the air? A. Pure air consists of about four fifths of nitrogen and one fifth oxygen, with small proportions of carbonic-acid gas, aqueous vapor, ammonia, ozone, and other constituents.

2577. Q. What is the effect of the oxygen, nitrogen, and carbonic-acid gas on the circulation of the blood? A. Oxygen is the chief useful part of air, and purifies the blood; nitrogen dilutes the oxygen, adding to its volume and decreasing its activity. Carbonic-acid gas is unwholesome, and an addition of five per cent is sufficient to render air irrespirable.

2578. Q. Why is it necessary to provide ventilation in a closed stable? A. In a closed stable there are no means by which nature can utilize her restorative processes—hence the need of ventilation. It is absolutely necessary to maintain or restore the proper constituents of the air, if we wish for health for ourselves or our horses.

2579. Q. Explain how the peculiar properties, or rather state of the gases, which respectively constitute foul and pure air, afford great facilities for ventilation. A. Heat causes all matters to expand—more or less; but gases under the influence of heat expand very rapidly, and to a very great degree; and as they expand they become lighter. As a general rule, foul air in a stable is also heated air. Besides the breath, a certain amount of heat is given off from the bodies of all living animals. Carbonic-acid gas, though at equal temperatures heavier, is nevertheless, when heated, as it is when first given off from the lungs, lighter than pure air; therefore it is only necessary to provide the means of exit in the highest part of the stable, and it will escape by its own inherent lightness.

2580. Q. Supposing that there are no means of escape for the foul air in the stable, what becomes of it? A. Since there are no means of escape, the heated foul air remains in the upper part of the stable until it gradually cools, and as it cools descends and becomes mingled with the air of the stable, and is in due course again presented to the nostrils to be breathed.

2581. Q. Supposing the foul air to have an exit above, how is the vacancy caused by its escape to be supplied by fresh air? A. If there are no apertures except those above, it is clear that by continued ascent and escape of heated foul air a tendency to a

vacuum will be created in the stable. The pressure of the atmosphere is fourteen pounds per square inch; hence, whenever a tendency to a vacuum has been created, the pressure of air on the outside is sufficient to overcome the upward current of heated air, and cold, fresh air will rush in at intervals to supply the vacancy. When the vacancy is supplied, the upward current and escape of heated air will be resumed until another tendency to a vacuum is created, when a similar indraught will occur again. Hence the unpleasant sensation of cold draughts coming down suddenly from above.

2582. Q. What should be done to provide against any sudden change in the direction of the current of foul air? A. By means of another and lower series of apertures, admit a certain proportion of fresh air sufficient to maintain the proper direction of the current.

2583. Q. Is it necessary to make the apertures for the admission of fresh air as large as those for the escape of the foul air? A. No; because if the upper apertures are properly constructed a considerable proportion of air comes in through the windows and under the doors, even though closed.

2584. Q. What is the most difficult part of ventilation? A. It consists in so arranging the apertures for the admission of fresh air without causing an unpleasant cold draught in some portion of the stable.

2585. Q. What is the effect of cold or cold draughts on horses? A. Their food goes less far, their coats become less sleek, and the highest development of condition cannot be obtained when the animals are subjected to such discomforts.

2586. Q. What is the amount of cubical air-space required by horses in stables? A. The minimum quantity of fresh air required by horses in stables has not yet been definitely ascertained, but it is believed that with good ventilation, drainage, paving, light and cleanliness, 1200 cubic ft., with a ground area of about 87 feet per horse, will be sufficient, though probably the minimum required, for the maintenance of health.

2587. Q. What circumstances modify the amount of cubical air-space required by horses in stables? A. Since the horse is not fed on animal food, the emanations given off from his body are less noxious than those proceeding from human beings; and, as he is far less susceptible of injury from draughts or cold than man, it is possible to give to stables a greater degree of ventilation than would be tolerable in a room; and, lastly and chiefly, the horse cannot, as men too often do, close the means of ventilation.

2588. Q. In the proper construction of stables, what is the real difficulty as regards proper ventilation? A. To admit fresh air in sufficient quantities to maintain the purity of the stable, without causing in some part or other a sensible and inconvenient

draught. The need of draught decreases in proportion as the air has a less distance to travel before it is presented to the nostrils of the horse.

2589. Q. When practicable, where should windows be placed in stables? A. Along the whole length of the stable, above the head of each horse.

2590. Q. What should be the dimensions of each window? A. Two feet six inches by three feet.

2591. Q. In a brick stable what contrivance should be provided for admitting fresh air when it becomes necessary to close the windows? A. A row of air-bricks should be placed immediately above the windows on both sides, and running the whole length of the stable. The air entering through these numerous but minute apertures will be considerable, but it can never amount to an excessive draught. It will be sufficient at most times to maintain the upward current of the air; and prevent an excessive down-cast current from the roof apertures.

2592. Q. How is a current of fresh air to be supplied to the horse while lying down in the stall? A. By means of a line of air-bricks placed fourteen inches above the floor of the stable, and above the bedding, a scarcely perceptible stream of fresh air will be supplied almost directly to the horse's nostrils when he is lying down. The air entering at these low points is also of great use in keeping in motion the air in the lower part of the stable, where it is otherwise especially apt to become stagnant.

2593. Q. Of what use are louver-boards in stables? A. They are a ready means of affording exit for foul air, and no construction offers so great facilities for doing this as an open roof with louver-boards running the whole length of the stable.

2594. Q. In stables in which the horses stand in double row what should be the depth of the louver, and about how much ventilating outlet per horse will it afford? A. The depth between the louvres should be sixteen inches, which will afford a ventilating outlet of about four feet per horse.

2595. Q. What should be the depth of the louver in stables where horses stand in a single row? A. The depth may be reduced one half of that when the horses are in double row, or eight inches.

2596. Q. What is the objection urged against open roofs? A. Open roofs, notwithstanding the great facilities they afford for ventilation, are often objected to, because the absence of ceiling generally implied in the term "open roof" is apt to render the stable unduly hot in summer, and unduly cold in winter, especially at night.

2597. Q. How may the objections against "open roofs" be obviated? A. By putting a ceiling on the roof, but at a distance of twelve inches from it. The current of air between the ceiling and the roof will keep the stable cool in summer, whilst the dis-



tance between the ceiling and the roof will prevent the cold from striking through in winter or at night. Or, the stable may be ceiled in the ordinary manner, with the exception of an opening of a yard wide in the middle, along the whole length of the stable.

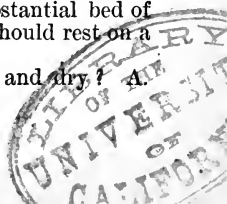
2598. Q. How would you ventilate a stable with a loft or rooms over it? A. Where louver-boards cannot be used, there should be one air-shaft twenty-four inches in diameter, lined with zinc, for every two horses, and running through the roof into the external air. The openings into the air should be protected by small louver-boards or cowls. The position of the air-shafts will depend largely on the use made of the rooms above. If the loft is used to store forage, it should have no connection with the body of the stable; otherwise the forage will become more or less tainted, and unfit for food. Each air-shaft should be provided with a board placed about six inches below the bottom of it, to break or diffuse any occasional downcast current.

2599. Q. What are the requisites of a good kind of paving for stables? A. A really good paving must be non-absorbent, water-tight, easily cleaned, durable, and not slippery.

2600. Q. Discuss briefly the different paving materials suitable for stables. A. Square-cut granite blocks are very durable, can be roughened to prevent slipping, as often as may be necessary, and are easily kept cleaned. Hard-burnt bricks, while cheaper than granite blocks, owing to the difficulty of baking the bricks equally hard throughout, wear rapidly into holes. To diminish slipperiness, the bricks are indented with transverse and longitudinal channels. Such paving is not easily kept clean, the urine and débris of the dung lodging in the transverse channels. It is better to have only longitudinal channels about one and one quarter inches in width, and three eighths of an inch deep. These will give sufficient foothold; they can be kept perfectly clean, and drain every part of the stall. The channel is formed by bevelling off the long sides of the brick, and should be set together in cement, which will make the channel water-tight. The bricks should be of the very best quality. Granitoid, a material made of the best Portland cement, and crushed granite, in proper proportions, on a foundation of four to five inches of concrete laid in the best grade of Louisville cement, and whose upper surface is locked and finished with a smooth finish of Portland cement and granite flour, makes a very durable, non-absorbent; water-tight, and altogether very satisfactory and comparatively cheap pavement, and is now being used in several modern stables lately constructed at military posts.

2601. Q. On what kind of bed or foundation should paving be laid? A. All paving requires to be laid on a substantial bed of concrete six inches thick, and the concrete itself should rest on a bed of broken stones twelve inches deep.

2602. Q. How is the paving to be kept fresh and dry? A.



All the bedding must be removed from the stable at the morning stable hour, and turned outside. The paving must then be swept thoroughly clean, and left to the drying and purifying influence of the air until the horses are dressed, when they may be bedded down. Every door and window in the stable should be set open whilst the horses are out.

2603. Q. What are litter-sheds, and what are they used for? A. Litter-sheds are open sheds, apart from and convenient to the stable, in which the litter is spread in inclement weather to get a thorough airing. In fine weather the litter should be spread out in the open, when it will, if turned over twice during the morning, get thoroughly ventilated and dried.

2604. Q. How high above the surrounding ground should the floor of a new stable be placed, and why? A. The floor of a new stable should be made (*at least*) eighteen inches higher than the ground outside. This facilitates natural and surface drainage, and in some degree secures the stable from damp, partly on account of the tendency of new floors to sink, and still more on account of the probability of the soil outside becoming higher from constant gravelling and repairs.

2605. What kind of drains are best for stables? A. Surface drains answer best for stables, except where concrete or bricks with longitudinal channels are used; a drain should be provided for the lower half of each stall, running down the middle of it, and connected with a drain passing behind the line of the stalls. The latter drain should run without any curve or angle to the outside of the stable, and should be continued about ten feet further as a surface drain, after which it may, if thought desirable, be discharged into an underground drain.

2606. Q. Where open drains are provided in stables paved with brick, cement, or other material, what slope should be given to them? A. For the drain in the stall a fall of one inch in thirty will be required, but for the main drain in rear of the stall a fall of one inch in sixty will be sufficient. At its starting-point the level of the drain should be very little below the surface of the floor, but its depth, in order to give an easy flow to the urine, etc., may increase gradually towards the outfall. In long stables undue depth of the main drain may be avoided, by making it fall from the centre to both ends of the stable.

2607. Q. How should the ground immediately around the stable be drained? A. Around the whole exterior of the stable, at a distance of sixteen feet from it, a surface drain should be provided. The intervening space should be paved with a gentle slope from the stable towards the drain. The pavement will be useful in throwing off the rain, which might otherwise sink into the foundations, and it will afford a convenient dry place for airing the bedding in fine weather.

2608. Q. What are the objections to underground drains in

stables? A. They require an amount of water which is not always available; hence the drain is apt to choke up with the débris of the dung and bedding, and in general is little better than a cesspool. Where underground drains are used their openings into the stable should be carefully trapped.

2609. Q. What slope, if any, should be given to the floors of stalls? A. Horses stand most comfortably on a perfect level; and any slope more than is absolutely necessary for drainage purposes is decidedly objectionable, in that it throws an undue stress on the hind quarters, and also on the flexor tendons of the fore legs by reason of the toe being more elevated than the heel.

2610. Q. What slope should be given to floors of stalls which are provided with underground drains in the centre? A. The floor should be made to slope from all four sides to the centre, and the horse will practically stand on a level.

2611. Q. What slope should be given to floors of stalls which are provided with surface drains? A. The upper third of the stall may be level, whilst the rear part will require a fall of one in eighty towards the main drain. The floor should also be made to slope in the rate of one in forty from both sides of the partitions towards the central drain. When cement or bricks with longitudinal channels are used, the slope from the sides to the centre of the stall will not be needed.

2612. Q. What are the requisites of a good site for stables? why? A. The well-bred horse is a native of a dry climate, and loves dryness. In damp he soon loses all life and spirits, and becomes debilitated. Disease of any sort is very apt to supervene on debility; hence the site of every stable should be deeply, thoroughly drained. The soil selected should, if possible, be gravel. The situation should be moderately high, open, and with facilities for natural drainage. Bleak situations are not desirable.

2613. Q. Which is the most desirable aspect for stables? why? A. In stables with windows on both sides east and west aspect will, as a general rule, be found most advantageous. The one side will have the morning, the other the afternoon, sun. There should be a door at each end or in the middle on each side, as may be most convenient to the particular locality. In long stables it is desirable to have doors at the ends and on both sides.

2614. Q. Discuss briefly the subject of walls and foundations of stables. A. The thickness of the walls will be governed entirely by the material used in construction, the temperature required, and the span and weight of the roof. To maintain an even temperature in the stable, the walls must be thick, and should be plastered on the inside; but, except for such special purpose, nothing answers so well for the inside of the stable as glazed bricks of white or any neutral tint. If they cannot be procured, the inside walls should be well pointed and whitewashed. In the ordinary plan of rectangular stable with a broad passage down

the centre, the walls will need to be at least fourteen inches thick, if built of brick, on account of the wide span and weight of the roof. To prevent the dampness from rising up the wall by capillary attraction, the foundations should be laid on slate, or on two courses of hard brick set in cement, or on asphalt.

#### STABLE FITTINGS.

2615. Q. Discuss the subject of the size of stalls and partitions.

A. For stalls divided by partitions a width of six feet is desirable for horses of ordinary size. The length of the partition should be ten feet or preferably ten feet six inches, exclusive of heel post. The heel post, into which the partition is inserted, should be rounded, so as to be as little likely as possible to injure the horse if he kicks against it. A height of seven feet and a half should be given to the upper end of the partition, in order to prevent the horses from biting each other; whilst five and one half feet will be sufficient for the remainder. To permit the horses to see each other, and to impede the current of air through the stable as little as possible, the extra height of the upper end should be made of open iron-work, of any ornamental pattern; straight iron railings do not answer, as horses are apt to catch them with their teeth. The boarding of the partition should not be continued within nine inches of the wall. This open space will act beneficially by allowing the air to circulate freely along the back wall of the stable. With a like view to ventilation, and also in order to preserve the woodwork from the injurious effect of damp, an interval of two inches should be left between the bottom partition and the floor of the stable. The partition boards should be one and one quarter inches thick, the kind of lumber employed depending entirely on the cost of construction. The boards should be placed longitudinally, to decrease the liability to splinter.

2616. Q. What should be the dimensions and how should loose boxes for sick horses be arranged? A. Twelve feet by fourteen, with a height of twelve feet, is sufficient dimensions for loose boxes. They should be provided with a staple fixed in the wall about two feet six inches from the ground, on which a pail may be hung, as sick horses carry their heads low and always prefer to feed near the ground. The door should preferably open outwards, and be divided into two parts; the lower part not exceeding three feet six inches in height, to enable the horse to hang his head over it, and enjoy the fresh air coming through the main passage of the stable. Where traverse doors are used, three bars should be provided for the same purpose.

2617. Q. Describe the best form of latches for use on stable-doors. A. The best latches are those which are countersunk and mortised into the doors. While more expensive, they are

safer than the ordinary latch, in that the chance of catching on them is reduced to a minimum.

2618. Q. What is a better substitute for latches? A. Slides or bolts, if countersunk and furnished with a flushing bolt, are in some respects preferable to the best latches.

2619. Q. What is the best form of hinge for hanging stable-doors? A. The only really serviceable hinges for large doors are those of the old-fashioned T-pattern. Doors on such hinges will generally hang true for years, whilst the hinge itself adds to the strength of the door by bracing and binding it together.

2620. Q. What are collar ropes or chains and logs? A. They are contrivances used to fasten horses in stables; and consist of a leather collar, a rope or chain attached to the collar, and running through a good-sized ring fastened to the manger, carrying at its other end a log heavy enough to keep the rope or chain taut, whenever the horse moves back beyond a certain distance.

2621. Q. What are collar ropes or chains and logs used for? A. They are intended to prevent accidents to the horse, such as getting the foot or leg caught in the halter strap, and casting in the stall.

2622. Q. How may the horse be relieved of the weight of the log, when collar ropes or chains and logs are used? A. By placing a large ring or T on the rope immediately above the manger ring.

2623. Q. What is the proper length for a collar rope or chain used with a log? A. The rope should be just long enough to allow the horse to lie down comfortably. Any greater length is objectionable. As an ordinary rule, the log should just reach the ground when the horse is standing near his manger. If longer than this, the rope or chain will become slack in the portion between the collar and manger, and then the horse may get his foot over it. If shorter it will interfere with the convenience of the animal in lying down.

2624. Q. From what does casting in the stall generally arise? A. Casting in the stall generally arises from the animal getting his legs entangled in the rope or halter strap; and when the length of the rope is properly adjusted and the log used, this accident will rarely occur. It occasionally arises from the horse endeavoring to turn or roll in his stall.

2625. Q. In what manner can a horse which habitually breaks or slips the halter be secured? A. Such an animal may be effectually secured by a strap buckled round one of the fore fetlocks and attached to a peg driven fast into the ground. The strap should be about twelve inches long. The animal may resist at first, but will soon find it useless to struggle, and give up with a good grace the attempt at getting loose.

2626. Q. Of what use are muzzles in stable management? A. They are contrivances made of wire and leather to be drawn over

the muzzles of horses known to be greedy feeders, to prevent them from eating the litter of their stalls. They should in no case interfere with the breathing of the horse.

2627. Q. Describe what a good manger should be. A. A good manger should be sufficiently deep to contain the full allowance of feed, and be provided with a slight lip on the inside, so as to prevent the horse from spilling the grain, which he is very apt to do. It should be free of corners or angles in which the grain can lodge, and so placed that it can be easily kept clean and sweet. The material should be non-absorbent, the cost largely affecting its character. Iron lined with china is perhaps the best; slabs of glazed fire-brick answer well. Iron mangers are largely used, and answer exceedingly well in barrack stables.

2628. Q. What are the relative merits of low hay-racks and those placed above the horse's head? A. The low rack, while it enables a horse to gather its food in its natural position, is more or less dangerous in that the horse frequently jumps into it and is in position to be seriously injured—which can never be the case with a rack placed above his head. Where low racks are used they should be made shallow, and without any projecting rim on the inside of the upper bar. Where the high rack is used there should be no communication between it and the loft.

2629. Q. What is the objection to storing forage in stables? A. Unless the room or loft in which the forage is stored be free from communication with the rest of the stable, the emanations from the stable will more or less taint the forage.

2630. Q. What is the value of ample light in the stable? A. Ample light is essential to the health of the eyes. Light is food and exercise to them. Without ample light the eyes cannot be strong. When altogether deprived of light the optic nerve becomes paralyzed, and blindness is the result. Again, ample light is essential to the cleanliness of the stable. A dark stable is usually more or less dirty, and a dirty stable must be unhealthy. Both eyes and lungs are especially liable to injury from gases produced by impurity.

2631. Q. Describe and discuss the four kinds of windows generally used in stables. A. 1st. The ordinary sash windows. They are objectionable from the fact that a direct draught may come on the horses, and on that account are frequently closed at night in cold and windy weather. A couple of panes of perforated glass are useful in such windows. 2d. Windows which turn on a pivot in the centre. These may be set open to any required degree. They answer well enough where many of them are used; but they are still open to the objection of causing direct draught on the horse. 3d. Windows which do not open wholly, but are furnished with glass louvres. They are objectionable, inasmuch as they are not calculated to admit a sufficient amount of air. 4th. Windows working on hinges at the bottom,

which may be opened to any required degree. They offer every advantage. They afford ample ventilation, and yet do not throw direct draught on the horses. They should be blocked, so as to prevent their closing within six inches at the top.

#### WATERING AND FEEDING.

2632. Q. Describe briefly the course of the food from its reception by the mouth to its passage into the stomach. A. The food gathered by the lips and front teeth is worked about by the tongue and cheeks, and is carried by their action to the back teeth or grinders, which by a lateral and slightly rotatory motion of the lower jaw reduce it to pulp, at the same time being thoroughly mixed with the saliva and mucous secretions of the glands of the mouth. Saliva is essential to the due preparation of the food for digestion. When it is sufficiently prepared, it is passed on in portions by the action of the muscles of the tongue to the gullet, and thence to the stomach.

2633. Q. Describe the structure of the stomach. A. The stomach is a pouch lined for about one third of its surface with a dense cuticular membrane, and the remaining two thirds is lined with a soft reddish villous mucous membrane. Its muscular coat is furnished with three layers of fibres, namely, the circular, longitudinal, and oblique.

2634. Q. Describe the action of the stomach on the food. A. By the action of the three series of muscles of the muscular coat the food is rotated over the cuticular and villous linings of the stomach; whilst by the secretions of the softer or villous lining it is supplied with a fluid called gastric juice, which is essential to the further process of digestion. The food at this stage is called chyme.

2635. Q. What is the action of the muscular coat of the stomach due to? A. Nervous influence produced by the presence of the food. When the stomach is quite empty the rotary motion ceases and the pouch is then in a state of contraction and quiescence.

2636. Q. Describe the further preparation of the food after it leaves the stomach. A. During the successive rotations of the stomach, such portions of the food as have become sufficiently soluble, are gradually pressed forward and passed to the small intestines. In them it is further mixed with the secretions of the pancreas, liver, and intestinal glands. The admixture of these juices completes the preparation of the food, and it is now ready for absorption into the system.

2637. Q. Describe the manner in which the absorption of the food is effected. A. The abdominal veins and the lacteal absorbent vessels of the intestinal linings take up from the food its

nutritive parts, which in this state are called chyle. The chyle is carried by the absorbent vessels through the mesenteric glands into the thoracic duct, and by it is ultimately discharged into one large blood-vessel on the left side of the neck near the heart. It is by this constant admixture of material taken from the food by the absorbents that the necessary supply of blood is maintained. From the blood thus maintained by the food are furnished the materials required for the maintenance and renewal of the body. The food supplies the blood, which in turn supplies the body.

2638. Q. After the veins and absorbents of the small intestines have taken up from the food its nutritive parts, what becomes of the refuse? A. The refuse is passed on to the large intestines. In them a further system of absorbents take up from the refuse whatever little nutriment may yet remain in it, and the residuum along with the waste products of the body, excreted into the intestines, is cast forth by the anus as dung.

2639. Q. Describe the course of water taken by the horse. A. Water does not lodge in the stomach, but passes rapidly through it and the small intestines on its way to the cæcum or blind gut, which may be considered as the real water stomach of the horse. From the cæcum the water is gradually taken up by the veins and absorbents according to the requirements of the system, and poured into the large blood-vessels in the neighborhood of the heart. Along with worn-out nitrogenous matters and certain salts, it is excreted partly from the lungs in the form of aqueous vapor, partly from the skin in the form of perspiration, and in larger and more notable quantities it is discharged from the body as urine through the medium of the kidneys.

2640. Q. What is the capacity of the horse's stomach? A. Its capacity is small in comparison to the horse's frame. He requires frequent feeding. In a state of nature he is almost constantly browsing, and yet it is rarely so full as to be unable to exert his powers of flight.

2641. Q. How often should a horse be fed? A. Experience has shown that three feeds a day is sufficient. Less feeding is decidedly objectionable. The grain should be divided into three portions, the hay into two. Hay should not be fed at the feed preceding the time for work. A horse works easier on a somewhat empty stomach than on one distended with hay.

2642. Q. What care should be exercised as regards the feeding of horses when heated and immediately after work? A. Horses in this condition should not be fed, as the stomach at this time is not in a good state for the proper digestion of the food. In the case of exhaustion from long and rapid marching, it would be beneficial to give at once a bucket of warm gruel when procurable. This being easily digested will serve to sustain the horses's strength, while under its influence and rest the stomach will recover its tone and be in condition to receive the



grain, which should not be given until the horse is cool and has been groomed.

2643. Q. What is the best time for feeding? A. The best time for feeding, as a general rule, is at the close of each stable hour. The horse will then feed more quietly, comfortably, and more at his leisure than when the men are about.

2644. Q. Is regularity in the hours of feeding desirable? A. Regularity in the hours of feeding is a matter of some importance. Over-lengthened abstinence is, for the reason of the small capacity of the stomach, in itself injurious, and the mischief is often aggravated by the animal eating to excess when he gets his food. An over-hearty meal is hurtful at any time, but it is especially so when the stomach is weakened by long fasting. Undue pressure and irritation are the result, producing indigestion, and in some cases gastritis, colic, etc.

2645. Q. What is the result of feeding forage of poor quality? A. It is absolutely necessary that the forage supplied should be good and sound. Inferior or damaged forage of any sort, such as mouldy hay, damp or kiln-dried oats or green meat kept till stale, or grazing on foul ground, very readily produce intestinal disturbance or disease. Besides which, we cannot expect to develop the best powers of the animal unless we supply him liberally with the best nutriment.

2646. Q. How often should horses be watered, and what quantity should be given at one time? A. The cæcum or water-gut being very large, it is probable that the horse does not require to be watered often. It is not an uncommon thing to see a horse drink two or even three pails of water at one time, most of this passing directly to the cæcum. In a state of nature, though no doubt the succulent character of the food, in part at least, supplies the place or want of water, it would be impossible that all horses on a large plain could be constantly at the riverside. In camp in the open air, even when feeding on dry food, the horse seldom ever drinks more than twice a day; but in the stable he drinks readily, and is refreshed by being watered at least three or four times a day.

2647. Q. What quantity of water should be allowed at one time? A. Excepting in the few cases, such as where the horse is excessively hot or exhausted, or has from any cause been kept without water for an undue length of time, or where there is a tendency to purgation or diuresis, the horse may safely be allowed to drink as much as he likes.

2648. Q. Should horses be watered before or after feeding? why? A. Horses should be watered before being fed. Watering after feeding is likely to cause colic, since water does not remain in the stomach, but passes rapidly through it to the cæcum; and when this occurs with a full stomach, the water is very apt to carry with it, from the stomach into the small intes-

tines, some portions of the food before it is properly prepared for transmission. Undigested food, though natural to the stomach in which it ought to be digested and prepared for transmission to the intestines, acts on the latter as a foreign body, and produces irritation.

2649. Q. What precautions should be taken in watering horses when warm? A. There is no objection to watering horses when warm, providing the horse is immediately groomed and properly cared for, or is soon thereafter to resume the march; the friction caused by grooming, or the exercise of marching, however slight, seems to prevent the occurrence of a chill. There is less risk in drinking cold water when the body is still actively warm than when the system has begun to flag. In the case of a horse thoroughly tired and fagged the water should be made slightly tepid, as in such case there may not be sufficient vitality to raise a large quantity of water to the temperature of the body; hence the animal may become chilled, and his coat will stare, his bowels become deranged, and further serious consequences may result.

2650. Q. Discuss the subject of dirty *vs.* clean water, and hard *vs.* soft water, in stable management. A. The horse naturally prefers soft to hard water, and will often drink of muddy soft water than clean hard water. He will never drink bad soft water in preference to good soft water, nor bad hard water in preference to good hard water. All things being equal, the horse will always drink of the cleanest water. Hard water, containing an excess of saline and mineral substances, does not, as a general rule, agree with horses as soft water, such as that obtained from rivers or ponds. It is apt to produce irritation of the bowels, and, as a secondary effect, a staring coat.

2651. Q. How may the salts contained in hard be easily precipitated? A. The salts may be in a great degree precipitated by boiling, and most water becomes soft by being exposed to the air.

2652. Q. What is the effect of sudden changes in the kind of water supplied to horses? A. It is apt to cause derangement of the bowels, and even irritation of the mucous membranes of the bowels, especially a change from soft to hard water.

2653. Q. What precautions should be taken in watering a horse predisposed to scouring? A. To such a horse water in reduced quantities should frequently be given. In cold weather the chill should be taken off by mixing it with a little warm water. The better plan is to leave water always before such horses: in such case they will drink less than when watered at intervals; the diminished quantity of water taken into the system, by lessening the secretions of the intestines, decreases the tendency to purgation.

2654. Q. What is frequently the real cause of scouring? A. An irritable state of the bowels, induced by the presence of

various crudities, arising from imperfect digestion or previous torpidity.

2655. Q. How should the animal be treated for scours? A. If the animal is strong and hearty, and not usually predisposed to the complaint, a mild dose of purgative medicine, followed by tonics, may be beneficial.

2656. Q. Where there is a tendency in the horse to scouring, what bad management may readily induce it? A. Any sort of neglect or bad management, such as washing the legs and not drying them; by letting the animal stand sweating after exercise without being dried and cleaned; by copious draughts of cold water when the body is heated; or by being watered immediately before fast work.

2657. Q. What measures should be taken to tempt the appetite and regulate the diet of delicate feeders? A. First, carefully note the peculiar habits of feeding of the animal, and as far as possible follow them in feeding. Some reject their food when given in large quantities, hence feed in small quantities at a time and frequently; others require water constantly before them while feeding; others are nervous and timid, and will not feed unless protected from their neighbors. Some require a change of diet, such as a little beans mixed with the oats, which might be first crushed, or some wet bran with the oats, etc. For others, carrots or green forage may be substituted for or mixed with the hay.

#### CHARACTERISTICS OF GOOD OATS.

2658. Q. What are the characteristics of good oats? A. Good oats should be clean, hard, dry, sweet, heavy, plump, and full of meat. They should have a clean and almost metallic lustre, the grains of nearly the same size, with few small or imperfect ones. The pressure of the nail on an oat should leave little or no mark. The kernel, when pressed between the teeth, should chip rather than tear. The skin should be thin. White oats, on account of the thinness of the skin, are preferable to black oats. Short, plump grains are preferable to large, long grains. Bearded oats must have an excess of husk. Good oats are entirely without smell of any kind, except that of the earth, in new samples.

2659. Q. What is the usual manner of testing oats? A. Oats are tested by smell and taste. In testing by smell, a good handful should be taken for the purpose, and not merely a few grains. In tasting oats, a considerable number of grains should be taken into the mouth in order to get a fair average of the grains. The flour should be almost tasteless, except a slight sense of milky sweetness. In testing for quality, a quantity should be spread out on a sheet of paper, when small and imperfect grains, and foreign substances, such as small black seeds, can at once be detected. The small black seeds are principally seeds of the wild

rape, tares, and wild mustard ; they are heavier than oats, and therefore add greatly to the weight of a sample when found in large quantities.

2660. Q. What is the object of kiln-drying oats? A. It is a process resorted to in order to get rid of either dampness or softness, or of both defects, in oats.

2661. Q. How can we tell when oats have undergone the process of kiln-drying? A. Kiln-dried oats have a peculiar and easily recognized smell and taste. In some cases there is a loose and shrivelled appearance about the ends of the husks, arising from the contraction, under heat, of the kernel, which had previously been swollen from damp. The color is deepened, and often of a reddish hue; but this color may be gotten rid of by fumigation.

2662. Q. Why should we object to kiln-dried oats generally? A. While kiln-drying may slightly damage the flour of perfectly sound oats, yet as a general rule the oats are already damaged when subjected to the process, which is only resorted to for the purpose of fraud ; no amount of drying will restore or improve the original character of the flour.

2663. Q. What is sometimes done by dealers to get rid of the smell of kiln-dried oats? A. The oats are spread out in thin layers to the action of the air, and just before being offered for sale a quantity of new fresh-smelling oats are well mixed in.

2664. Q. What are foxy oats, how may they be detected, and what is the objection to feeding them? A. Foxy oats are those which have been heated from being kept in bulk when not perfectly dry, and in consequence have undergone to a certain degree a process of fermentation. They are easily recognized by a reddish and sometimes very red color, and by a peculiar bitterness of smell and taste. They are unfit for horses, the nutritive quality of the flour being destroyed. They act injuriously, especially on the kidneys, produce excessive staling, and cause the horse rapidly to lose condition. The red color is sometimes gotten rid of by fumigation.

2665. Q. Why are oats fumigated or bleached, and how can it be detected? A. To get rid of the color given by kiln-drying or by the oats having become foxy. The oats are exposed to the fumes of sulphur, which give them an unnaturally white hue. If we take a handful of the oats from the heap and bring it quickly to the nose, the odor of the sulphur will condemn the oats. When the process is well managed the odor is quite faint, and should be carefully guarded against.

2666. Q. What is the objection to damp oats? A. Oats which have become damp and have been stored in bulk for some time soon become musty, soft, or begin to sprout. Dampness, however, is in some measure a question of degree, and of the length of time during which it has existed.

2667. Q. What is mustiness in oats, and how may musty oats be recognized? A. Mustiness is a stage of decomposition resulting from dampness. They are recognized by the smell. They are altogether unfit for food, and are sometimes poisonous. When examined under a microscope a fungoid growth may be detected on the inner skin.

2668. Q. What are mouldy oats? A. They are oats in a positive state of decomposition, and are wholly unfit for food.

2669. Q. Explain what is meant by sprouting in oats, and its cause. A. Sprouting is a process of new growth or germination in the oat, induced by damp, combined with some amount of warmth under certain conditions of the weather.

2670. Q. In what does sprouting differ from mustiness or mouldiness? A. Sprouting is a process of new life, while mustiness or mouldiness are processes of decomposition and death of the grain.

2671. Q. Are sprouting oats fit for food? A. They are quite unfit for food.

2672. Q. How can old oats be distinguished from new oats by the smell? A. The chief distinction between old and new oats lies in the smell. New oats smell fresh and of the earth. Old oats, even while they may smell fresh, have lost this earthy smell; as a rule, they will smell musty, and frequently of rats.

2673. Q. How can old oats be distinguished from new oats by its general appearance? A. The outside of the husks of new oats is bright and shining, having almost a glazed appearance, especially in the black variety. In old oats the glazing is lost. The outside, though it may be perfectly clean, is dim, and the ends of the husks, in white oats, are always a little darkened. Badly saved new oats may in these respects sometimes resemble old oats, but in such cases they will probably be distinguished by their softness.

2674. Q. How can old oats be distinguished from new oats by taste? A. The taste of new oats is fresh and somewhat milky, and its flour when moistened in the mouth readily adheres together. The taste of the old oat is slightly bitter. In the mouth the flour feels dry, and is not easily moistened. In the new oat there is a certain degree of juiciness, sweetness, and milkiness about its flour.

2675. Q. How can old oats be distinguished from new oats by the sense of touch? A. New oats as a general rule are softer than old; but the season, the state of the weather, and the dampness perhaps of the place in which they have been stored may cause old oats to handle as soft as new. On the other hand, in very fine seasons new oats may come to market almost as dry and hard as old oats.

2676. Q. How can old oats be distinguished from new oats by the skin of the kernel? A. The skin of the kernel of a new oat

is covered with very fine prickly down, composed of very minute hairs. In the old oats the kernel appears and feels more smooth. If the husks are stripped off, this distinction will be quite perceptible to the palate in chewing a few grains of each.

#### HAY.

2677. Q. Into what classes may hay be generally divided?  
A. Into upland, lowland, and water-meadow hay.

2678. Q. Describe briefly each classification. A. Upland hay, which is the best, comprises all grasses which grow on upland meadows, and sometimes on low-lying well-drained meadows, lying on dry foundations, the best upland grasses being found only on upland meadows. Lowland hay comprises those grasses found in low-lying meadows, and is inferior to upland hay, although grasses are found in them which are also found in upland hay. Water-meadow hay comprises the grasses found in water-meadows, and is unfit for food. Grasses growing in low-lying meadows may also be found in water-meadows, while the best water-meadow grasses may be found in low-lying meadows. No line of demarcation can be drawn between the several classifications, which are general only.

2679. Q. What is the distinction between upland, lowland, and water-meadow hay? A. Upland hay is known generally by the fineness and firmness of the stalks or stems, and by the narrowness of the leaves of its grasses; specially, it is recognized by the prevalence of certain grasses, such as rye grass, meadow fescue, meadow fox-tail, meadow cat's-tail or timothy, etc., which do not grow on low land; and, again, by the presence of certain sorts of herbage, such as white or Dutch clover, common red clover, little yellow clover, yellow vetch, sainfoin, which do not grow on low land. Lowland hay is known by the coarseness of the stalks and by the broad leaves of its grasses, and by the absence of good upland herbage. The direction of the stems and leaves is not well preserved; it is a tangled mass; the color is darker than that of well-saved upland hay. It has a stronger and less delicate aroma, the texture is more woolly, and it feels more soft or less firm. Altogether, it lacks firmness, crispness, cleanliness, freshness of appearance, and delicacy, both of substance and aroma of good upland hay. Water-meadow hay is at once recognized by its very coarse, broad, often reed-like stalks, and by the very broad, often flag-like, leaves of its grasses, and by a large admixture of sedge, and plants approaching the nature of sedges and rushes.

2680. Q. What are the characteristics of good upland hay?  
A. The characteristics of the best hay are clearness, firmness, crispness, and green color; delicacy in taste, aroma, and appearance; the presence of flowers of their natural color; of numerous

grasses, with sweet vernal and other early grasses in flower ; and a proportion of good herbage.

2681. Q. What can be told as to the proper saving of the hay by its color? A. Whether or not heating or fermentation to any extent has taken place in the stack. Slight heating is almost unavoidable where the hay has been cut early, whilst the juices are still in the grasses. This slight heating will darken the bright-green color of the hay somewhat. A shower of rain falling on new-cut hay or exposure to a very hot sun may cause hay to lose its bright-green color, although the hay may have suffered no damage.

2682. Q. What does the presence of flowering heads of grasses indicate in hay as to the time of cutting? A. It indicates that the hay was cut early, before the grasses ran to seed and lost their juiciness and nutritive qualities.

2683. Q. Is a good proportion of herbage desirable in hay, and why? A. A good proportion of herbage is desirable ; herbage makes the hay sweet and palatable, horses preferring good hay mixed with a proportion of herbage to hay composed of the best grasses alone. A great variety of grasses is also desirable in hay.

#### GROOMING.

2684. Q. What fact, as regards its care, constitutes the difference between the care and management of the domesticated horse and the animal in a state of nature? A. Work and food constitute the difference. Work increases the secretions of the glands of the skin. Hard work requires high feeding to keep the animal in strength. High feeding increases these same secretions. To give free and easy exit to these secretions, the skin must be kept clean and the pores opened. Fast work increases the action of the skin, hence the necessity of exciting the skin to the healthy performance of its function, and therefore grooming becomes a necessity. The horse in nature feeds on food more or less laxative in character, the *débris* of the food and the excretions of the system are mainly carried off by the action of the bowels and kidneys ; hence the necessity of exciting the action of the skin does not exist, and grooming is not necessary to his general health.

2685. Q. Describe briefly the structure of the skin. A. The skin is a dense, porous membrane, investing the whole body. It is composed of two layers, namely, the outer or upper, called the cuticle or scarf-skin, which is hard and insensitive ; and an under or inner layer, called the cutis or true skin, which is sensitive and vascular. These two layers are easily separated, as is seen in cases of slight burns or in the vesicles raised by a blister. The cutis or true skin is thick, and full of blood-vessels, nerves, and absorbents. From it the layers of cells which constitute the

cuticle or outer skin are formed. Each cell is originally round, and filled with moisture; but as the moisture evaporates the cells become flattened, and being laid in a series one over the other, they form the cuticle, or outer skin. The outer scales are constantly being cast off in the form of dandruff or scurf, and are as constantly renewed by the secretion of new cells from the true skin below.

2686. Q. How does the skin vary in substance over the different parts of the body? A. In parts much exposed, as in front of the knee, it is very thick; in parts less exposed, as behind the knee, it is thin; whilst on the inside of the thigh, where it is not exposed at all, it is very thin.

2687. Q. Describe the glands of the skin. A. The skin has two sets of glands, having their origin a little below the true skin, namely, the "sweat" and "oil" glands. The "sweat" glands secrete perspiration, and terminate by long-necked tubes on the surface of the skin. They are very minute, but cover the body in such large quantities as to form one of the largest secreting organs in the body. The "oil" glands secrete an oily material. They open, some on the surface, but mostly into the tubes of the hairs. Each hair-tube is furnished with one or more of these glands. Wherever there is much friction or motion in the skin, the oil-glands are very numerous, as, for example, at the heels, and in the bend of the knee and hock.

2688. Q. What relative quantity of worn-out material is thrown off the system of a horse, in hard condition, through the glands, and what artificial means must be taken to promote this activity of the glands? A. It is estimated that the excretions through the pores of the skin in the form of perspiration during twenty-four hours are equal to the amount of dung excreted in the same time, since perspiration is constantly taking place, whether at rest or in motion. In the domesticated horse these glands are highly developed by hard work, high feeding, and by grooming; the pores of the skin are kept open, and their activity increased.

2689. Q. Describe the structure of hair. A. Hair springs from the cellular tissue, on which the true skin rests. Each hair root is enclosed in a distinct sac of its own, called a follicle. The base of the sac is supplied with blood-vessels, from which the materials for the formation of the hair are secreted. The manner of the growth of the hair is similar to that of the outer skin, namely, by cells. The cells are pushed up by new cells forming below. They gradually become flattened and elongated into fibres to form the central shaft of the hair, while the outer part is covered by flattened cells or scales overlapping each other, like slates on the roof of a house. The cells are cemented together by adhesive matter, which is secreted as they grow.

2690. Q. How often does the horse shed his coat? State the manner of its shedding, and the reasons therefor. A. The horse



sheds his coat twice a year—in spring and autumn. At those seasons the nourishment of the old hair is arrested, the soft pulpy extremities shrink and dry up, and the hair becomes detached and falls off; whilst at the same time a new hair is formed and pushed up by its side.

2691. Q. Describe the whiskers and their function. A. The whiskers have a similar origin to the hairs of the mane and tail. They are supplied for protection, and are consequently made stiff and supplied with a nerve, rendering them delicate feelers.

2692. Q. What are the two principal objects gained by grooming? A. 1. Keeping the skin free from particles of sweat, dust, or other matter, which might clog or impede the free action of its glands. 2. Removing scurf or worn-out cells, which have the same action on the glands as other foreign matter.

2693. Q. How should the brush be used in grooming? A. To thoroughly cleanse the skin and excite the action of its glands, the groom should stand well away from the horse, when his weight and muscular strength should be vigorously applied to the brush, to cause it to penetrate to the skin. The general direction of brushing should follow the direction in which the hair lies; but when necessary to remove dirt or matted hair, it should be rubbed against the hair. Grooming requires skill and hard labor.

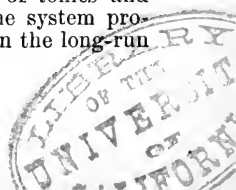
2694. Q. What are some of the results of neglect of grooming? A. Loss of flesh and condition, deterioration in health, sometimes actual disease, the most common being caused by the presence of parasites—such as mange and lousiness. These parasites breed extensively in the neglected horse, while they will never remain where constantly disturbed by grooming. They are positive signs of neglect.

2695. Q. Mention some of the subsidiary uses of grooming. A. Glossiness and shortness of coat, and the development of the highest powers of the animal.

2696. Q. What is glossiness of coat due to? A. To the absence of dirt, debris of worn-out materials, and particles of perspiration among the hairs; partly to the mere mechanical effort of friction in polishing the hair, but mainly to the increased secretion drawn forth from the oil-glands of the skin under the friction of good grooming.

2697. Q. What are short coats due to? A. Partly to the warmth produced in the skin by the frequent friction of grooming, and partly to the maintenance of an even and moderately warm temperature in the stable.

2698. Q. What improper means are sometimes used to produce short and glossy coats? A. The administration of tonics and other stimulants, which by artificially exciting the system produce temporarily a good external appearance, but in the long-run are the fruitful parents of disease.



2699. Q. On what grounds is the practice of grooming at morning and evening stables based? A. Horses are groomed in the morning to remove from the skin the insensible emanations of the pores which have accumulated during the night; and at evening, after exercise, to remove from their skin the more sensible emanations of the pores, commonly called sweat.

2700. Q. How does exercise assist in keeping the skin clean? A. A horse which has not been exercised during the day in some respects requires more labor to get his skin thoroughly clean than if he had been at work. A little gentle perspiration every day, and occasionally a somewhat freer opening of the pores, greatly assist the process of grooming; the brush is aided by increasing the active use of the glands by means of sensible perspiration.

2701. Q. Why should a horse be groomed immediately after exercise? A. All the pores of the skin are then open, and the brush will more effectually clean the skin than if the operation is delayed until the skin has cooled and its pores closed, and the perspiration has dried and caked over them.

2702. Q. When it is not practicable to groom, how should a horse be cared for immediately after exercise? A. He should be warmly clothed, and flannel bandages placed on his legs if the exercise was of a violent character. When this is not practicable his saddle or harness should be kept on, and the animal protected from draughts. Leading at a gentle pace until cooled is very desirable.

2703. Q. What is the danger of allowing a horse, when heated, to stand undried? A. When a horse is heated his whole circulation is quickened, and an increased quantity of blood determined to the surface of the body. A chill will drive this blood suddenly to the inward and vital parts. Though the horse may be chilled externally, the excited state of the circulation continues for some time longer. The heart continues to send blood rapidly through the system. This continued supply, repelled from the surface, is forced on the already overloaded internal vessels; hence may arise serious diseases, such as inflammation of the lungs or pleuræ, bronchitis, or other inflammatory or congestive affections.

2704. Q. What care should be given to horses coming in wet, either from rain or the wet and muddy condition of the road? A. To eliminate all chances of producing cold from the evaporation from the wet coat, the saddle or harness should not be removed, as it protects the back and loins. The animal should be covered with a rug or warm blankets, and if necessary a second blanket should be thrown over the loins. The legs should be thoroughly dried, as they are sooner susceptible to chill than the other parts of the body. Washing the legs with water to remove the dirt or mud, if practised, must be immediately followed by a careful drying of the legs. The use of wisps of

straw in drying the animal is recommended. Bandaging the legs after washing, to dry them, if followed by brushing them thoroughly, cannot be seriously objected to. After the legs have been thoroughly dried, the body should then be dried by the use of wisps of straw and grooming-cloths. The clothing should be removed gradually, and only from that part of the body which is under friction. After the skin is thoroughly dried the brush should be applied.

2705. Q. What is the effect of washing the skin with water to cleanse it? A. Water has very little effect in cleaning the skin of a horse. The hair acts as a thatch, and water penetrates through it with difficulty, except it is out of order, and then it acts as an irritant. Besides this, it tends to check the action of the oil-glands and to render the coat dry and harsh by removing the oily secretion.

2706. Q. How should the nostrils, the eyes and ears, the dock and the hoofs, be cared for? A. The nostrils should be carefully and gently distended by the fingers and gently wiped out with a slightly moistened sponge or grooming-cloth; then, likewise, the corners of the eyes, the ears, the dock. After which, commencing with the near fore-foot, each foot should be picked up, carefully examined, and cleaned out.

2707. Q. How much time is required to properly groom a horse? A. In the morning or after ordinary work about thirty minutes will be required. This does not include the time required to lead out and water. The condition of the horse upon his return from work or exercise determines how much more time will be required for his proper care.

2708. Q. What is meant by breaking out after cleaning? A. The appearance, in some horses, of a cold sweat after being dried and cleaned after exercise. It results either from debility, a thick woolly coat, or a combination of both.

2709. Q. How do the horses of a mounted command bear witness to their proper care? A. By the bright, clean, and healthy appearance of their coats; absence of long, shaggy coated animals.

#### EXERCISE.

2710. Q. Why is regular exercise essential to the well-being and development of the horse? A. As air is to the lungs or food to the stomach, so is exercise to the due development of the muscles, tendons, ligaments, and respiratory organs. In the horse, on account of the active exertions which we require from him, we wish to get the muscles as firm, the tendons and ligaments as strong, and the respiratory organs as vigorous as possible; we therefore give exercise more or less severe, according to the use for which the particular horse may at the time be required.

2711. Q. What is muscle? A. Muscle is simply flesh, made up

of bundles of fibres laid parallel to each other, which under nervous influence possesses the power of contraction.

2712. Q. On what does the strength or tenacity of the fibres chiefly depend? A. On the use to which they are subjected, becoming soft and flaccid, and incapable of sustaining strain when disused.

2713. Q. What is the effect of paralysis of the nerve of a muscle? A. Loss of power of contraction in the muscle.

2714. Q. What are tendons? A. Tendons are dense, firm, fibrous, and almost inelastic organs, attached at their upper extremities to the ends of the muscles, and at their lower extremities are generally inserted into eminences of bone. They possess no power of motion or contraction in themselves; they are found wherever strength combined with lightness is required, and where muscle on account of its bulk would be inadmissible.

2715. Q. How are tendons strengthened and developed? A. By regular use. They require constant use to give them the strength required to enable them to sustain the violent usage to which in the horse they are so often subjected.

2716. Q. What is the effect of regular and gradual exercise or work on the animal frame? A. The power of the lungs, muscles, tendons, and ligaments to sustain long and violent exertions is gradually increased, and they are brought to such a condition as to safely perform an amount of work and to support a strain which without progressive training they would be wholly unable to stand.

2717. Q. What is the effect of neglect of exercise? A. The horse in high condition, if not exercised for even a few days, will put on fat. The supply of the large amount of material required for consumption caused by his work still continues; fat followed by plethora, and frequently by disease, will be the speedy consequence.

2718. Q. What should be considered in regulating the amount of exercise? A. The age, condition, constitution, make and shape, the state of the legs, purpose for which the animal is intended, and feed should all be considered in regulating the amount of exercise required to develop the fullest powers of the animal without overworking or overstraining them.

2719. Q. Why is good feeding particularly necessary in regular exercise? A. To replace the consumption and waste caused by exercise, and thus prevent weakness or debility.

2720. Q. What is the proper amount of exercise required for saddle-horses? A. For horses in ordinary condition, two hours' work in the course of a day, provided in that time a distance of ten miles is traversed.

## STABLE MANAGEMENT.

2721. Q. What six essentials are required in successful stable management? A. 1. Ample supply of pure fresh air at all times in the stable; 2. Judicious watering and feeding; 3. Good forage; 4. Good grooming; 5. Good shoeing; 6. Sufficient well-regulated exercise.

2722. Q. What is the proper temperature for stables, and what should govern it? A. The stable should be kept at an even and moderately warm temperature. In spring, autumn, and winter the stable should be kept as comfortably warm as possible without making it close and offensive. The aspect of the stable, thickness of walls, ceiling or absence of ceiling, rooms overhead or adjacent buildings must all be considered. From fifty to sixty degrees is recommended in well-paved, well-drained, well-ventilated, and clean stables.

2723. Q. In the artificial warming of stables what is recommended as the best form? A. Open fires, which assist in the ventilation of the stable.

2724. Q. What should be the general temperature of stables in summer? A. Stables should be kept as cool as possible. Doors and windows must be freely opened.

2725. Q. Of what benefit is a registering thermometer in a stable? A. It serves as a good check on the bad practice of closing up stables, and keeping them too warm.

2726. Q. What care should be taken before putting horses in a new stable? A. New stables are generally damp. Damp stables are very objectionable; hence a new stable should be thoroughly aired and dried before horses are put in them.

2727. Q. What is the effect of suddenly changing a horse from a warm to a cold stable, and the reverse? A. Horses rarely suffer in health from sudden change from a warm to a cold stable, while the reverse change is often followed by coughs and colds.

2728. Q. What care should be given to the manes and tails of horses? A. Manes and tails should be brushed, not combed. Combing pulls out the hair and soon destroys it.

2729. Q. On what side should the manes of troop horses be dressed? A. On the near side, to enable the trooper to readily grasp a lock of the mane in mounting.

2730. Q. How should the horse be bedded? A. After the horses are removed from the stable in the morning, the bedding should be entirely taken out of the stable, thoroughly shaken out, and cleaned; the refuse removed, and the straw allowed to dry, exposed to the purifying action of the air, care being taken to turn it over several times so that all parts of it may be acted on. At a convenient time it can be mixed with the daily allowance of new straw and the stalls bedded. In wet weather it should be

removed from the stalls and placed in the main passage of the stable, where it should be thoroughly well shaken to free it of the dung and rotten or matted straw. The refuse should be removed from the stable, while the serviceable straw should be permitted to lie in the passage until it is thoroughly aired and dried.

2731. Q. How should kicking in stalls be treated? A. Many remedies are suggested, but it is believed that sufficient light and the exercise of care, placing in the same stall only those animals which are congenial to one another; or, in the case of a particularly confirmed kicker, a horse fully capable of protecting himself in this respect, that the friendship in one case and the return in kind in the other case, will soon cause a disappearance of the vice.

2732. Q. What is meant by weaving? A. It is a constant oscillation from side to side, and is the result of ennui from want of proper exercise. It results in no particular harm.

2733. Q. What is crib-biting, and what should be done to check it? A. It is a trick of catching at the manger or picket rope with the upper incisor teeth, and is accompanied by a muscular spasm and peculiar guttural sound easily recognized. The evil arises from the amount of wind sucked into the stomach and the injury to the incisor teeth. Many devices for correcting this evil have been suggested, all of a mechanical character; but it is believed that the use of a loose box, offering no projections or convenience for the accomplishment of the trick, together with plenty of exercise, will give better results. When once confirmed, the habit is difficult to overcome, and is directly traced to want of proper exercise and the consequent ennui.

2734. Q. What is the value of bran mashes in stable management? A. Bran mashes are cooling and slightly laxative, and therefore a fitting preparation for a day of rest. A cold bran mash should consequently be fed on Saturday evening. Warm bran mashes for sick horses are made by pouring boiling water on bran in a pail, and covering it with a cloth to retain the steam. A handful of dry bran thrown over the top of the mash will answer the same purpose.

#### CONFORMATION.

2735. Q. Describe the essentials of a good horse. A. A good horse is an animal with many good, few indifferent, and no bad points.

2736. Q. How does the work for which the animal is intended affect the importance to be attached to defects in his conformation? A. Shapes which are objectionable for one kind of work, as saddle work, may often be unobjectionable for light-draught purposes. Thus, a hollow back or very high withers, which are objectionable in a saddle-horse, could possibly not be seriously objected to where weight is not to be placed on the back.

2737. Q. Do certain kinds of work call for special points in the horse? A. Yes; for it is plain that points required in a race-horse, a charger, or trooper are not necessarily required in a draught-horse. In the draught animal we want all that contributes to strength and weight and aptitude to put on flesh; whilst in the racer, charger, or trooper we need those shapes which are most likely to give speed combined with endurance.

2738. Q. Discuss briefly the shape of the head. A. The head should be small. A large head acts like a heavy weight at the end of a long lever. It has a tendency to make the horse heavy in hand; though this also much depends on its setting on, and on the obliquity or otherwise of the shoulders. It also operates unfavorably on the progression, is apt to make the horse stumble, may help to overbalance him. For riding-horses large heads are objectionable. A small head is a marked sign of breeding, whilst a large head denotes an underbred animal. A long, lean head is, however, often found in well-bred horses.

2739. Q. Describe the points of a well-bred head. A. The well-bred head, though small, is wide across the forehead, lean, unencumbered with flesh, finely chiselled, and terminates rather wide at the nostrils. The base of the skull is wide. The distance from the eye to the angle of the jaw is great. It is also wide under the jaw, in order to allow ample room for the larynx and respiratory passages. In high-bred horses we often have a prominence in the forehead, with a sinking in just above the nose.

2740. Q. Describe the proportions of the forehead in a well-shaped head. A. The forehead and base of the skull is not only relatively but absolutely broad, in order to give due capacity for the cavity containing the brain and great nervous centres. Energy and resolution largely depend on the development of the nervous system; pluck and endurance will assuredly be wanting if the nervous power is deficient. It is rather a curious fact that small, well-bred heads are actually wider between the eyes than large, coarse, underbred heads; or, in other words, the brain region is larger in high than in underbred animals.

2741. Q. Describe a good nose, nostrils, and muzzle. A. It should be nearly straight, well developed, and slightly prominent; the nostrils wide, free from hairs in the entrance, the borders scanty and ending abruptly. They should occupy the whole lower part of the facial structure. The horse breathes entirely through his nostrils; hence large, well-developed nostrils indicate capacity for speed and endurance, and are of great importance. The muzzle should be fine and well shaped. Coarse muzzles indicate coarse breeding.

2742. Q. Describe the essentials of a good mouth. A. It should be small, with thin, firm lips; a small, prominent tongue fitting its cavity snugly, the bars sharp and firm. Coarse flabby

lips, large flat tongue, with flat-topped bars, indicate coarse breeding, and are highly undesirable in a trooper.

2743. Q. Describe the qualities desired in the eye. A. The eye should be large, prominent, and mild, with a well-developed brow and fine eyelids.

2744. Q. How does the eye assist in determining the character of the horse? A. The expression of the eye largely indicates the character of the horse. An eye set in prominent sockets, permitting a large range of vision, accompanied by a mild expression, generally indicates a bold, fearless, gentle, and tractable character. Deep-sunk, narrow eyes are generally indications of vice in one form or other.

2745. Q. Describe the qualities desired in the ear. A. The ears should be thin, delicate, small, and pointed, that is, directed forwards. The points should be nearer to each other than the roots. Horses with their ears close at their base are generally nervous. When the horse is at work the ears should be kept firm. If they hang loosely, it indicates want of tone and muscular development. Large flabby ears mark an underbred horse.

2746. Q. Describe the character of the mane in the well-bred and underbred horse. A. In the well-bred horse the hair of the mane is fine, silky, and generally rather scanty. In the underbred animal it is coarse, curly, and generally thick and abundant.

2747. Q. Discuss the proper form of the neck. A. The neck should be light, moderately long, and taper off towards its upper end, in order that the head may be set on at a suitable angle. It should be "long in the rein"—that is, longer at its upper than at its under side. Unless it is so formed the neck cannot be properly arched, nor can the head be well set on. The upper line of the neck from the withers to the head should form an elegant curve, while its lower surface should be gracefully incurved as it approaches the jaw, and it should join the chest by an easy-flowing line rather above the point of the shoulder. The crest should be firm under the grasp of the hand. The throttle, or commencement of the larynx, should stand out boldly, and the lower branches of the jaw-bone adjoining the neck should be wide apart, so as to give ample room for the respiratory passages.

2748. Q. How does a short, thick neck affect the horse's handiness? A. A short, thick neck continued to its junction with the head will interfere with its proper bending, and the horse will generally poke out his nose.

2749. Q. Describe the formation and shape of the withers. A. The withers are formed by the spinous processes of the anterior dorsal vertebræ, which in this region are more fully developed, or, in other words, rise higher than in other parts of the back. To these processes are attached many muscles, liga-



ments, and tendons, which control the motion of the forehand. Horses with very fine, high withers, though the formation is handsome and perhaps suitable for a charger, will not, as a general rule, stand severe work as well as those a little coarser at this point. Low withers do not afford sufficient leverage for the muscles, ligaments, and tendons of the forehand. Low withers are generally combined with rather straight shoulders.

2750. Q. What two bones compose the shoulder? A. The scapula and humerus.

2751. Q. Describe the scapula. A. The scapula, or upper bone of the shoulder is a triangular flat bone with a spinous process on its outer surface, and extends obliquely forward from a point a little below the withers to the point of the shoulder.

2752. Q. What position and formation of the scapula is most favorable for the mechanical working of the muscles and tendons which elevate the forehand? A. Its position should be oblique, and the bone itself long and broad.

2753. Q. Discuss the relative merits of "straight" and "oblique" shoulders. A. When the angle formed by the scapula and humerus is more or less obtuse, the shoulder is said to be more or less straight, and there is a mechanical deficiency of power, since the humerus can only be brought by muscular action in the same line as the scapula, and the action is consequently diminished. When, however, this angle approaches or is nearly a right angle, the shoulder is then said to be oblique, and the mechanical power is at its greatest; and therefore it is of much consequence, in selecting a saddle-horse, to carefully observe that the scapula and humerus form as nearly as possible a right angle.

2754. Q. Describe the humerus. A. The humerus, or lower bone of the shoulder, should be rather short. When very short the mechanical action of the shoulder is placed at a disadvantage; while, if over-long, it has the effect of placing the forelegs too much under the horse, and the weight of the animal is thereby thrown too much forward. Such formation is unsuitable for riding.

2755. Q. Describe the chest. A. The chest should be deep, moderately broad, and plump in front. Breadth and depth give capacity to the cavity of the chest, in which are situated the lungs and the heart. Undue breadth and circularity of the chest is objectionable, because it has the effect of placing the fore-legs too far apart, and thereby causes a rolling motion in the gait. Depth of chest is desired, because it increases the breathing capacity without adding the disadvantage due to excessive breadth and circularity, and assists in maintaining the saddle in its proper place.

2756. Q. Describe the radius, or upper bone of the leg. A. The radius, or upper bone of the leg, should be long in proportion

to the length of the leg ; it should be thick and big, and well supplied with muscles. Muscular development in the arm, and in the corresponding portion of the thigh just above the hock, are points of primary importance.

2757. Q. What is the proper position of the point of the elbow ?  
A. In a well-made horse the point of the elbow should be full and clear of the chest. It should not incline inwards, and it should not appear to "dig" into, the chest at every step, as either of these two positions will interfere seriously with the action of the fore-legs.

2758. Q. Describe the points required in a well-formed knee.  
A. The knee should be large and prominent ; wide laterally—flat when viewed in front ; narrow when viewed from behind, owing to the well-developed and long trapezium-bone, which gives good attachment to the muscles and ligaments.

2759. Describe the metacarpal bones. A. The metacarpal bones, between the knee and fetlock, are three in number ; the centre or great metacarpal bone and the two small metacarpals, or splint-bones, which lie on each side of the great bone. The centre metacarpal, called the shank or cannon-bone, should be short and strong. It is subjected to much strain or overwork, and cannot have too much strength. It should lie "straight" in its course from the knee to the fetlock, neither bowed backwards or forwards, nor curved laterally. Any deviation from a straight line is both a cause and sign of weakness. The small metacarpals do not descend to the pasterns, their office being to support the outer bones of the knee-joint.

2760. Q. Describe the fetlocks. A. The fetlock comprises the large or upper pastern-bone, or *os suffraginis*, and the small or lower pastern-bone, or *os coronæ*. It should be of moderate length. When very long it is necessarily weak with undue strain on the ligaments and tendons. If short it will be too upright, and cause more or less concussion.

2761. Q. What is the function of the sesamoid bones ? A. They give attachment to the suspensory ligaments, and should, therefore, be large and well developed. They also act as rollers for the great flexor tendons of the legs, which pass over them.

2762. Q. What is the *os pedis*, or coffin-bone ? A. It is the bone of the foot, and rests on innumerable springs. Concussion is thereby so expended as to be greatly lessened in the frame above. It varies in size in different horses.

2763. Describe the position and function of the navicular bone.  
A. The navicular bone is a small bone placed at the inferior and posterior part of the coffin-bone. It acts chiefly as a roller for the *flexor perforans* tendon, where it makes its bend prior to insertion into the lower part of the coffin-bone.

2764. Q. Describe the proper size of the fore-feet. A. With regard to the shape and make of the horse, the fore-feet should be

of medium size. Large feet usually have a weak crust; the animal is likely to brush; the action is rendered heavy and lumbering, and the horse soon becomes fatigued. Small feet are generally brittle and too upright, and more likely to be contracted. Any difference in size of the feet of the same horse should be looked upon with suspicion, as indicating disease past or present in the feet. The slope of the crust of the fore-feet should form an angle of between 50 and 52 degrees with the ground. The horse should be tough and sound. A ringy condition of the horn is very objectionable, as indicating weakness and want of tone in the secreting organs. It is usually the result of inflammation of the feet or any debilitating disease.

2765. Q. Describe the sole of the foot. A. The sole in a well-formed foot is moderately concave, so that its margins receive a sufficient portion of the pressure to preserve the health of its tissues. In the upright foot the sole is usually excessively concave or shrunk in, and is very hard, while in the flat foot the sole is almost flat and in some cases nearly convex, when it is very susceptible to injury.

2766. Q. Describe the frog. A. The frog is an elastic cushion placed at the back of the foot in order to lessen concussion in the animal's frame, and also to act as a stay in slipping. To preserve it in a healthy condition, the frog should at all times be permitted to perform its function. Any arrangement or circumstance which removes it permanently from contact with the ground, and prevents it from receiving pressure, will cause it to shrink and become diseased. It should be moderately large, bold, and clean, and should feel firm and elastic to the touch.

2767. Q. Describe the proper appearance of the leg below the knee. A. The leg from the knee to the fetlock should be straight, flat, and broad. The tendons should stand out from the bone, and should feel tense, distinct, and hard; and the interspace between the tendon and the bone should give to sight and feel hollow. If this space is filled up with soft substances, the leg will appear gummy. The leg from the knee to the pastern should be straight. If the bone deviates from the straight line it will be weak, and we shall probably find splints or some other indication of weakness at the point of deviation if the horse is put to hard work. If the bones incline outwards, we shall probably find the toes turned out; while if the bones incline inwards the horse will probably be pigeon or in-toed. Prominence of the trapezium—a bone at the back of the knee—is a most important point. If this bone is small and undefined, the ligaments and tendons will also be small and undefined, and the leg will be small immediately below the knee.

2768. Q. Describe the shape and form of the back. A. The back should be straight and not over-long. It is strongest when straight and short, and weakest when both long and hollow. A

certain amount of length in the back is, however, essential to speed. A short-back horse is apt to overreach, unless his shoulders are very oblique and his action good. Moreover, he cannot get his hind-legs sufficiently under him.

2769. Q. Discuss the shape and form of the ribs. A. The ribs should be deep and oval throughout, and especially behind the saddle. This formation is essential in order to give due capacity to the cavity of the chest and that of the stomach. Flat-sided horses are very objectionable. The ribs should be continued well back towards the pelvis. If there is an undue interval,—that is, an interval exceeding a hand's breadth between the last rib and the point of the hips,—the horse will be certain to run up light if subjected to work. A similar incapacity to stand hard work will be found in horses whose posterior ribs are wanting in due length and insufficient arch. In the former case the animal is said to be slack, and in the latter case light in the ribs.

2770. Q. Describe the form and shape of a good pelvis. A. The pelvis should be broad, deep, and oblique, and its spinous processes, called the hips, should be moderately wide; but they need not be so wide as to be unsightly, or to give the appearance known as "ragged hipped." Breadth and depth are needed, in order to give space for and attachment to the muscles of the hind-quarters. All propelling power in the horse is derived from these muscles. They should therefore be large and well developed, and it is essential to appearance that they should be laid smoothly and evenly. Obliquity in the pelvis is needed in order to give due length to the quarters.

2771. Q. Describe the form of the loins. A. The loins should be large, well arched, and fully furnished with muscle. The muscle should be evenly supplied, so that the outward appearance may be smooth and round. The thighs should be deep and full. There should, however, be sufficient interval between them to prevent friction. Horses with heavy, thick thighs set closely together will not answer for fast work. A want of muscular development, such as is indicated by the animal being split up behind, is most objectionable.

2772. Q. Describe the hind-quarters generally. A. The hind-quarters, taken as a whole, should be long, deep, full, round externally, and placed well under the centre of gravity. The portion of the back from the pelvis to the tail should be straight and long. Due length in this part is essential both to power and to appearance. Length from pelvis to hock is essential for speed and power; the muscles will be thereby increased in length and volume, and the animal will gain in power and speed.

2773. Q. Describe the form and shape of the hock. A. The outline of the hock should be clean, rigid, and well defined. Puffiness or swelling in any part is a sign of weakness or disease. The bones should be large and prominent. Size is essential to

strength, and prominence is necessary in order to afford due leverage and attachment to the ligaments and tendons. Large and prominent bones are usually accompanied by large and well-developed tendons and ligaments. The hock as seen laterally should be wide both above and below. Strength and size of bones and ligaments are both indicated by lateral width.

2774. Q. What should be the inclination of the leg from the point of the hock down? A. It should be inclined a little under the body—this conformation being the one best adapted for jumping and speed, because it allows the legs to be brought well forward in action. If the leg is inclined very much forward, the formation becomes weak, because the great bend made at the hock will occasion strain on the ligaments and tendons of that important structure.

2775. Q. What is the effect when the leg is placed perpendicularly under the hock? A. Excessive concussion and great strain, especially in halting and turning, and consequent liability to diseases such as spavin, bog-spavin, and thorough-pin.

2776. Q. What is the effect when the leg inclines backwards? A. The horse cannot draw it well under his body, and there will be want of propelling power. The hock will be liable to sprain, etc.

2777. Q. What is the effect of lateral deviation in the leg from the hock down? A. When the hocks are inclined either too much out or too much in, they are very liable to weakness and therefore disease. In the first case the horse is said to go wide behind; in the second he is said to be cow-hocked. In either case the action is defective and unsightly.

2778. Q. What should be the formation and shape of the *os calcis*? A. It should be well developed, very prominent, and isolated as it were from the substance of the thigh, in order to give due leverage to the tendons passing over it and attached to it, and also attachment to the ligaments belonging to it.

2779. Q. Describe the form and shape of the body. A. The body should be long and low; that is, it should stand over a good deal of ground, and yet be deep and broad in all parts. The length should be due to a large, long, and oblique scapula and long quarters; not too long and badly coupled loins. Length is essential to speed and breadth to endurance.

2780. Q. Give the general rules for determining the exact position in standing by means of a plumb-line. A. 1. A vertical line falling from the point of the shoulder should meet the ground nearly at the point of the toe; if it meets the ground much in front of the toe, the equilibrium is imperfect and the horse unsafe. If it falls behind the foot, the horse is probably long in the fetlock and with low heels, and he will in consequence be very liable to sprain of the ligaments of the fetlock. 2. A vertical line falling from the middle and back part of the arm should equally divide

the knee, cannon, and pastern, and should reach the ground a little behind the heels. If the line falls within the heels, the horse must have an upright pastern; while if it falls at a considerable distance behind that point, the pastern is unduly long. 3. A vertical line let fall from the middle of the fore-arm ought to divide equally all inferior parts. If the said line falls more exteriorly, the legs are too close; while if it falls within, the legs are too wide apart. 4. If the said line divides equally the knee and leg as far as the fetlock, but afterwards falls on the inside, the toes will be turned out; while if the line falls more exteriorly, the horse will be pigeon-toed.

2781. Q. Why is the cavalry horse required to be of uniform and hardy color? A. Uniform and hardy color, as, for instance, a bright bay with dark legs, or a rich brown, indicates a more or less vigorous constitution? while lighter shades of these colors, such as a common brown running to bay about the legs and flanks, or a bay with light, mealy legs, generally indicate weakness of constitution. The explanation of this peculiarity is said to be that all color is dependent on light and heat. Now the heat of the body is greatly dependent on the circulation, which again is dependent on the vigor of the constitution. If the circulation be weak, there will be a want of tone throughout the body producing the weakness or washiness of color. This weakness will, of course, be felt especially in the extremities which are furthest removed from the centre of circulation.

2782. Q. What information is required in preparing the descriptive list of a cavalry horse? A. Color, sex, age, height, and distinctive marks.

2783. Q. What is meant by the terms star, race, snip, and blaze? A. A star is a round or roundish white spot on the forehead. A race is a narrow white streak down the face. It may be a continuation of a star, or it may be separate and distinct from it. It may be straight or crooked. A snip is a white mark on a nostril or side of a nostril running down to the mouth. It is sometimes continued to the lower lip. The part is often devoid of hair, and in such case has a flesh-colored appearance. All the marks may be separate or they may be combined. A blaze consists in the whole half of the face being marked by a broad streak extending to the mouth.

2784. Q. In addition to the distinctive marks, such as star, race, snip, etc., what others should be mentioned in describing a horse? A. White legs or heels, spots of any color, gray hairs in the mane or tail, or about the body. Blemishes, if any, such as saddle-marks, scars, broken knees, permanent enlargements about any part.

2785. Q. When examining a horse for purchase, what is the only safe rule to follow as to soundness? A. Look for faults, and reject for "any one really bad fault."

## PRINCIPLES OF SHOEING.

2786. Q. What is the principal aim of all shoeing? A. The preservation of the outer case of the foot, which includes: 1. The preservation of the crust and bars whole; 2. The preservation of the frog; 3. The preservation of the sole.

2787. Q. Describe the general structure of the foot. A. The foot is a sensitive, vascular structure, with a bone or rather two bones, and a portion of a third inclosed within its outer case. The outer case consists of: 1. The crust or wall and the bars; 2. The sole; 3. The frog.

2788. Q. Describe the structure of the crust or wall of the foot. A. It consists of a number of fibres containing a soft, cellular, nutritive material running down longitudinally from the crust. It grows from the thickened skin round the coronet, as the finger-nail in the human subject. The crust is overlaid externally by a gluey, glazed, superficial layer. The fibres of the crust contain the above-mentioned soft, cellular material in an organized form, perhaps two thirds of the distance down. In the lower portion, the crust becomes dry and hard, and the fibres are then in a condition, first, to stand wear, and, secondly, they are in a state to be worn off by friction with the ground. The fibres are constantly being removed by growth from above.

2789. Q. What is the effect of rasping the crust high up where the fibres are vitalized? A. Rasping produces two evils: 1. The outer and strongest layer of fibres is destroyed; and, 2. The gluey, superficial layer which overlies the outside of the crust is destroyed, and then the moisture of the horn, which is essential to its toughness, escapes. In consequence, the horn becomes brittle, and then shrinks and contracts. Again, the moisture having escaped, the horn becomes hard. In this condition the horn presses unduly on the vascular and sensitive parts within, especially on the sensitive laminæ, and causes them to become hot, inflamed, and ultimately diseased.

2790. Q. What is the effect of rasping the crust below the point to which vitality extends? A. Two evils result—the one mechanical, the other vital through injury to the mechanical arrangement of the foot. Since the width of the crust, including the fibres which interlace it with the laminæ, may be said to be about three quarters of an inch, by rasping the width is probably reduced to half an inch, destroying the strongest fibres. Hence undue concussion, heat, inflammation, and disease. The first portion of the injury is mechanical; the second, a result of the mechanical injury, is vital. The sensitive internal structures are injured. Moreover, the strongest horn-fibres having been destroyed, the nails have a less firm hold, and consequently the shoe is easily pulled off, and probably a considerable portion of the weakened crust will come away with it.

2791. Q. Why do farriers rasp the crust? A. Because they find it less difficult to fit the foot to the shoe than to shape the shoe to fit the foot.

2792. Q. What is the primary essential of all good shoeing as regards the crust? A. That the outside of the crust be not rasped.

2793. Q. How is the crust to be lowered without causing injury to its structure? A. By removing all that requires to be removed from the ground surface of the crust without touching the superior part. This will be best done by the rasp from underneath, though, if the crust be very long, the knife may be used. After a sufficient quantity has been removed, the ground surface must be made perfectly level for the reception of the shoe by the use of the rasp. The strength of the fibres of the crust will not be in any degree lessened by shortening them.

2794. Q. What should be done to prevent splitting of the crust after having lowered it? A. After lowering and levelling the crust, it will be sharp all round its exterior circle. It is recommended that this sharp or feather edge of the crust be removed by applying the rasp from below to the under edge of the crust, and drawing it round so as to produce a blunt edge. This should be invariably done before applying the shoe; and, when properly done, no marks of the rasp will be visible above the rounding.

2795. Q. Describe the bars and their function. A. The bars are a reduplication inwards of the crust at the heels. They are stays provided by nature to the back part of the foot against contraction. The continuity of the circle of the crust is broken at the heels by the intervention of the frog. Here some stay or buttress is needed to prevent wiring of the crust of the heels.

2796. Q. What is the effect of cutting them away to open the heel? A. It results in contraction, a condition opposite to the one desired. After several years of this practice the bars almost cease to exist, since pressure and weight are essential to their development.

2797. Q. What is the effect of paring away the sole from the angle between the crust and bars? A. Since this portion of the sole is intended by nature to assist in sustaining the bars in their proper position, paring it away may cause the bars from want of due and natural support to wire in towards the crust. This wiring produces undue pressure on the seat of corn situated at this point, and may ultimately induce corn.

2798. Q. Describe the sole of the foot. A. The sole consists of two layers, an outer and insensitive, and an inner or upper and sensitive layer. Immediately above the upper and sensitive layer is the coffin-bone, or *os pedis*. Hence the sensitive sole is placed between two hard substances, namely, the lower insensitive layer and the bone of the foot. Thus, if undue pressure comes on the lower layer, the upper and sensitive layer will be crushed between the two hard substances, and great pain and perhaps



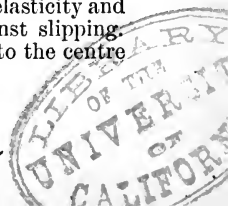
inflammation will ensue. The sole is not constructed for sustaining weight, except at its junction with the crust or wall, where it is thickest and strongest. Its fibres are composed of softer horn-cells than those of the crust; nor is it intended for sustaining pressure except at this particular point. It is a recessed surface, and is therefore not intended to be exposed to pressure. While the crust is worn away by friction with the ground, the sole, which from its recessed position is not exposed to any such wear, of its own accord, from some peculiarity in the material composing its fibres, exfoliates in flakes when its outer surface becomes effete.

2799. Q. From what mechanical causes may undue pressure be brought on the sole? A. 1. From paring away the outer or insensitive layer, which renders it incapable of duly protecting the sensitive sole; and, 2. From mutilation of the crust and frog.

2800. Q. Explain how undue pressure may be brought on the sensitive sole as a result of paring. A. The farrier cuts away the insensitive sole under the erroneous impression that if not removed it accumulates, becomes very hard, and causes pressure on the sensitive sole, and this cutting is carried on to the point at which the insensitive sole will yield to the pressure of the thumb. The actual result is undue pressure caused by the drying and shrinking up of the remaining fibres of the insensitive sole, which become very hard instead of soft and moist, having at once lost the protection of the outer fibres instead of gradually when no longer required.

2801. Q. How may the sensitive sole be subjected to undue pressure from the mutilation of the crust and frog? A. The frog and the crust or wall of the foot are intended by nature to sustain the greater part of the whole weight of the frame. If the crust be weakened by rasping and thereby rendered insufficient to sustain the weight, a portion of the weight will come on the sole at the part not intended by nature to bear weight or pressure. A similar effect is produced by the mutilation of the frog. The frog is intended by nature to sustain a large portion of the weight of the animal.

2802. Q. What are the functions of the frog? A. The frog is intended by nature for pressure and friction, and under the influence of its natural use will thrive, develop, and become strong. Without pressure and friction it will shrink up and dwindle away, and almost cease to exist. The healthy, well-developed, and strong frog has three principal uses: 1. By receiving on itself a large portion of the jar and concussion due to the movements of the animal, it transmits the same to other portions of the frame in a greatly diminished degree. 2. By its elasticity and wedge shape it acts as a stay on the ground against slipping. 3. It acts as a support to the coffin-joint, especially to the centre of the navicular bone.



2803. Q. Discuss the shape of the foot generally, and the apparent reasons therefor. A. The shape of a good foot at its lower or ground surface approaches that of the circle. The crust should grow down at an angle of between 50 and 52 degrees. The ground surface has doubtless been made circular, because that form affords within a given circumference a greater weight-bearing space than any other. Other circumstances, however, require a slight modification of the circular form. The continuity of the circle is somewhat broken at the heels by the insertion of the wedge-shaped frog, and anteriorly it is somewhat squared off by the wearing down of the toes. Again, the circular form is less perfect on the inner than on the outer side, because the crust is thinner on the inside than on the outside and more upright.

2804. Q. What advantages are gained by the diminution of the thickness of the crust on the inside and by its uprightness? A. 1. The chance of interference of one foot with the other is lessened. 2. Greater elasticity is afforded, thus obviating the greater concussion which falls on the inside due to the greater weight falling on that side.

2805. Q. In considering the strength required on the inside of the foot, what three points should be borne in mind? A. 1. Weight falls more perpendicularly on the inside than the outside of the foot, and the two inside crusts are more directly under the centre of gravity than the two outside crusts. 2. The two inside crusts are nearer each other than the two outside crusts, and therefore each requires less strength. 3. The fibres of the crusts on the inside are more perpendicular than those of the outside, and are thereby better placed for sustaining weight.

2806. Q. Should the feet be pairs, and if not what inference should be drawn from the fact? A. They should be pairs, any difference in size between the fore-feet or between the two hind-feet is almost sure and certain sign of disease, either past or present, in the foot or in some part of the limb directly or indirectly connected with it, or of some irregularity of action.

#### DETAILS OF SHOEING.

2807. Q. What should properly be the breadth of the fore-shoe? A. The crust or wall of the foot, including the substance intervening between the crust proper and the sensitive laminae is about three fourths of an inch. This is the proper weight-bearing structure of the foot. The shoe should then be as wide as the weight-bearing structure; and, since it must rest not on a part, but on the whole of this structure, it must be made flat towards the foot. A greater width of shoe than that stated above is useless and objectionable, in that it will afford a receptacle for dirt, gravel, etc., to lodge, and will also render the shoe liable to be sucked off in deep mud. The shoe should be of even width until it ap-

proaches the heels. Towards the heels, where the crust gradually comes to a point at its junction with the bars, the shoe must also come to a point, the inner edge of its heel exactly following and resting on the bars.

2808. Q. What should govern the thickness and weight of the shoe? A. Since the growth of the foot renders it necessary that the shoe be refitted at the end of a month, the thickness and weight of the shoe will be governed entirely by the work required, the peculiarity of the wear of the shoe in each case, and the character of the ground on which the horse is worked, allowing in addition a small amount for contingencies.

2809. Q. Describe the under or ground surface of the shoe. A. The ground surface of the shoe should be concave. This is the form in which nature has moulded the horse's foot. A concave ground surface has a great practical advantage, inasmuch as the shoe gets a much greater hold on the ground, and the horse is therefore less liable to slip or pick stones.

2810. Q. What determines the length of the shoes? A. The length is determined by the length of the crust. The shoe must be the exact and full length of the crust. If shorter than the crust, the heels of the shoe will be apt to press upon and dig into the seat of corn. If made longer than the crust, the hind-shoes may catch in the heels of the fore-shoes and pull them off.

2811. Q. Describe the manner of fitting the shoe. A. The crust having been lowered by the rasp, and rendered smooth and its sharp edge rounded off by the rasp, the shoe must then be so fitted that its outer edge corresponds exactly with the crust. It must not be smaller than the crust, nor overlap it in the slightest degree. If the shoe is too small, the crust would have to be rasped down to it; if too large, treads and other injuries may result. The shoe must be moulded to fit the foot.

2812. Q. Describe the manner of removing the old shoes. A. The clenches should be cut carefully without injury to the crust, and then each nail should be drawn separately.

2813. Q. How many nails are required to fasten the shoe, and how determined? A. The fewest that will retain the shoe securely in its place. The number depends on various considerations—such as size of foot, soundness and toughness of crust, accuracy of fitting of the shoe, and the nature of the ground on which the horse is to be worked. For riding-horses with sound crust and accurately fitting shoe, five nails will be found sufficient; namely, three on the outside, and two on the inside of the shoe.

2814. Q. Where should the nails be placed in the shoe, and why? A. Since the greater wear of the shoe comes on the toe, it is obvious that by placing the nails at the toe their heads will soon wear out, and consequently their hold greatly diminish—hence the first nail on the outside should be placed just back of the point of extra wear, and the other two nails on

that side should divide evenly the distance from the first nail to the heels. On the inside, on which there should be only two nails, the second nail should be placed exactly opposite the second nail on the outside, as nails placed exactly opposite each other have greater holding power than when placed irregularly.

2815. Q. How should the nails be driven in the foot? A. The nails should be so driven as not to bend them in the crust, and be brought out about an inch above the shoe. If brought out higher, there will be risk of injury to the sensitive part of the horn. If lower, they will not get sufficient hold. The heel-nails may be brought out somewhat lower than the toe and quarter nails.

2816. Q. What is the advantage gained by countersinking the nail-heads in the shoe? A. The nail-heads are thus made to wear evenly with the shoe, if the countersinking is accurately done. No portion of the thin part of the nail should be in the shoe, nor any portion of the thick part in the crust. The thin part should begin where the nail quits the shoe to enter the crust.

2817. Q. Describe the manner of clenching the nail. A. Clenching is the technical term for turning down the end of the nail after it has been driven through the crust. The nail should be broken off as short as possible, and turned down and flattened with a hammer. The rasp should not be applied to the clench. Any filing will weaken it, and may cause it to break off. It should be flattened with the hammer; where the crust is thin and brittle, it may be advisable to rasp the underneath side of the clench, so as to make it bend easier.

2818. Q. What is meant by the term "nail-bound"? A. It is applied to irritation of the feet, occasioning slight lameness from the nails having been driven too near the quick. The remedy consists in carefully drawing the nails and replacing them by others driven more carefully.

2819. Q. What are tips? A. A tip is a piece of iron designed to cover the toe and anterior portion only of the quarter while the heels and bars are left uncovered or unprotected. The length of the tip should be one half that of the ordinary shoe.

2820. Q. What are the advantages gained by the use of tips? A. 1. Freedom is secured to the heels, which are the most common seat of contraction. 2. Concussion, and the diseases which arise from it, must be greatly diminished by substituting the natural action of the heels and frog for the jar of the iron shoe against the ground. 3. The heels and frog are strengthened and developed by being brought more actively and prominently into work and wear. 4. The liability to slip is much lessened.

2821. Q. What are the principal objections urged against tips? A. 1. That they do not afford sufficient protection to the foot; that a horse, for instance, cannot travel safely over stones. 2.

It is urged that with hard roads and hard work the heels and frogs will wear away.

2822. Q. Describe what is known as the Charlier method of shoeing. A. The Charlier system consists in fitting a narrow rim of iron into a groove cut round the lower margin of the crust of the hoof by means of a special knife protected by a movable guide. The shoe is made less than one half an inch in width at the toe, narrowing gradually and becoming thinner as it approaches the heels, and shorter than the ordinary shoe. The inner and upper edge of the shoe is rounded off to prevent injury to the adjacent sensitive structure. The nail-holes are made oval to prevent splitting or spreading out of the narrow rim of metal. The heads of the nails should be of the same shape, and fit well in the holes. For ordinary feet four nails are sufficient. At the first shoeing the groove in the crust should be made rather shallow, and the shoe should be let in only half its depth. At each shoeing thereafter the groove may be cut deeper, until eventually the under surface of the shoe is flush with the sole. The shoe must be fitted hot, as it is important that it should have a level bed to rest on, and it must fit the groove perfectly. The shoes are not well adapted to the hind-feet.

2823. Q. What are the advantages claimed for the Charlier method of shoeing? A. Preservation of the natural condition and functions of the foot. It is valuable if judiciously applied, in cases where from previous mutilation or other causes it would be difficult, if not impossible, to bring the frog to the ground; in cases of contracted feet, weak heels, ossified cartilages, brush, etc., provided the hoof is strong. It is unsuited to flat feet.

2824. Q. What general principles govern the shoeing of the hind-feet? A. The general principles are the same as those which regulate the shoeing of the fore-feet. The crust must not be rasped, the sole must not be pared out, the frog must not be mutilated, and the shoe must be accurately fitted. Since the crust or wall of the hind-foot is thinner, i.e., narrower than the fore-foot, the web of the shoe must also be narrower. It should not exceed one half inch, which is the width of the crust.

### SEATS AND SADDLES.

#### THE FRAME-WORK OF THE HORSE CONSIDERED FROM A MECHANICAL POINT OF VIEW.

2825. Q. Give a brief description of the inclination of the processes of the spinal column of the horse. A. Looking at the spinal column, the frame-work of the back, on which the rider's weight is placed, we perceive that, while the under line of the vertebræ is nearly straight, although not quite horizontal, inclining somewhat towards the forehand, the spinal processes of

the first thirteen vertebræ of the back (dorsal vertebræ), reckoning from the point where the neck is attached, incline backwards, whereas those of the fifteenth, sixteenth, seventeenth, and eighteenth dorsal vertebræ, and the six lumbar vertebra, incline forwards, the fourteenth dorsal vertebra, with its process, standing perfectly upright.

2826. Q. What mechanical contrivance may it be assumed to resemble? A. The arch; the fourteenth vertebra and its process forming the keystone.

2827. Q. What is this inclination of the processes of the vertebræ towards a central point intended to do as regards motion? A. It limits the motion of the back downwards and upwards (i.e., vertically).

2828. Q. What vertebra is the centre of motion of the horse's body? A. The fourteenth; the point about which the several movements of the fore and hind legs are performed with various degrees of rapidity, either simultaneously or successively.

2829. Q. What do these movements of the fore and hind legs about this point constitute? A. The various paces of the horse.

2830. Q. How is it further shown that this vertebra is the point about which these various movements are performed? A. By the distribution and points of attachment of the muscles of the back and adjacent parts of the fore and hind quarters.

2831. Q. Putting the progressive movement of the animal out of the question, as being equally applicable to all its parts, in what proportion does the internal motion of the several parts of the body increase? A. In proportion to their distance from the fourteenth vertebra.

2832. Q. How does this affect burdens placed on the animal's back? A. The same is applicable to burdens placed on the horse's back, especially a rider whose frame is subject to its own peculiar motions, some of which are caused by the progressive movement of the bearer.

2833. Q. Examining the horse standing at ease, what facts in regard to the fore and hind legs are indicated? A. That the fore-legs are essentially bearers; and that the hinder ones, although chiefly propellers, are also to a certain extent bearers.

2834. Q. What in regard to the centre of gravity? A. That a perpendicular line falling through the centre of gravity would lie nearer the shoulder than the perpendicular falling through the centre of motion, and would probably cut the twelfth or perhaps the eleventh vertebra in some horses.

2835. Q. How does the distribution of the weight to be carried affect the horse's speed? A. In action the fore-legs are chiefly bearers, and only in a small degree propellers, while the hind-legs act chiefly as propellers; hence the propelling powers of the hind-legs may be favored by weighting forwards within certain limits; while weighting too far forwards makes the fore-legs exclusively

bearers, thus interfering seriously with the lifting action of the forehand, and this occurring simultaneously with the propulsion from the hind-quarters, the animal is in danger of falling forwards. Weighting too far back diminishes the propelling power of the hind-legs, by converting them in a great degree into bearers, thus diminishing the speed.

2836. Q. How does action affect equilibrium and balance in walking and trotting? A. In walking and trotting the horse moves its diagonal legs simultaneously, or nearly so; that is to say, the off fore and the near hind leg move together and alternate in this action with the near fore and off hind ones; so that while the one pair is being moved forwards the other sustains the weight of the animal; and supposing the horse to be in *equilibrio* or balance, it might be supposed that the perpendicular line passing through the centre of gravity would fall exactly in the centre of the line connecting the fore and hind foot that remains on the ground. But this is not the case except for the moment the movement is half completed.

2837. Q. What is the effect of action on equilibrium in cantering and galloping? A. In cantering and galloping, the two legs at the same side are advanced simultaneously, the other two remaining behind. Supposing the animal to be in equilibrium, we observe the following to occur: the horse "leads" with the two off feet; that is, canters on the right hand, the two near ones remaining behind so long as he remains on this hand; there is, therefore, not the same alternate vibration of the centre of gravity from right to left, and *vice versa*, as in trotting and walking, for it is always the same pair of feet that mainly support the weight.

2838. Q. How does absence of perfect equilibrium affect the action of the horse? A. Where it does not exist, a horse is either liable to overstep—that is, when weighted too far forward—or to step short when weighted too far back. When a horse oversteps with his hind-leg the track of the fore feet, the succession of full lines connecting the diagonal feet in each alternate movement is not continuous, but broken; there is, therefore, an interval of time during which the weight of the horse and rider is not supported diagonally, but vibrates, as it were, from one fixed basis to a more forward one. The animal is off the ground with all four legs for a moment in rapid trotting, for instance; the consequence is, that there must be less stability, and we know from experience that, when this is carried to a great extent, the horse "overreaches," and is in danger of coming down.

2839. Q. For military purposes, what position should the centre of gravity of the horse and rider have with reference to the centre of motion? A. They should coincide, to enable the cavalryman to turn in sharp curves at the higher degrees of speed.

2840. Q. How does the construction of the horse's legs and the

relative position of the various bones composing them furnish clear proof that the fourteenth vertebra is the real centre of motion, both at rest and in action? A. There is one bone in each of the hind and fore legs through which the remainder of the limb acts as a lever on the whole frame, either for the purpose of propelling (hind-legs) or of supporting and lifting it (fore-legs). They are the thigh-bone and the arm-bone, whose upper ends have their fulcrum or points of support in the hip-bones and shoulder-blades respectively, the power being applied through the medium of the remaining portion of the legs at their lower ends. The greatest result of lever-action is exercised at right angles to the lever.

2841. Q. With respect to the arm-bone and thigh-bone, what should be particularly observed in the examination of a horse? A. That the arm-bones and thigh-bones should lie at right angles or nearly so to the shoulder-blades and hip-bones respectively, which is recognized by the form of the haunch and what is called a "good shoulder," the length of the blade and its power depending on these particulars to a great extent.

2842. Q. How do the principal muscles and their arrangement further prove that the fourteenth vertebra is the centre of motion? A. The principal muscles of the back, loins, hips, and shoulders coalesce into the large, flat tendon covering the portion of the back pointed out as the centre of motion. The tendon has no contractile power, and the corresponding sets of muscles of the fore and back hand exert their contractile powers upon it in opposite directions while it remains stationary.

2843. Q. Where will the weight of the rider be best met? A. The weight of the rider will be best met when it acts in the opposite direction to the resultant of the two forces exerted to support and propel it, and this position would in most horses be over the centre of motion; but as in many horses the two forces of the fore and hind legs may not be equal in intensity, the judicious rider must endeavor to find the proper balance of forces, and place himself over that point.

#### THE SADDLE, AND ITS INFLUENCE ON THE SEAT.

2844. Q. What general mechanical principle applies to the shape of the surface of the saddle coming in contact with the horse's back? A. That the larger the surface over which a given amount of pressure is equally divided, the less will be the action on any given point of the other surface in contact; that is to say, the under surface of the saddle should bear as nearly as possible the same relation to that part of the horse's back it is intended to occupy as a mould does to a cast that is taken from it, with the exception of the back-bone, which should never be in contact.



2845. Q. What general mechanical principle applies to the size or extent of the under surface of the saddle? A. That the greater this is with a given weight, the less will be the pressure on any given point, provided always that the pressure be equally distributed over the whole surface.

2846. Q. What would be the result of attempting to make one portion of the saddle come into closer contact than another? A. Since the cohesion between two surfaces is produced by the sum total of the pressure, concentrating the pressure on one point does not increase the cohesion, but is more likely to produce a sore back.

2847. Q. What should govern the size of a saddle? A. The size should be proportioned to the weight to be carried.

2848. Q. How may the weight of the saddle be decreased without making the side-bars too narrow? A. By not extending the tree beyond the surfaces where it really has to support pressure; and the use of materials combining great strength and moderate elasticity with the least possible weight.

2849. Q. Suppose the saddle to have the proper form and size, how should the rider sit in it to divide and spread his weight equally over its bearing surface? A. The rider's centre of gravity should be exactly over the centre of the bearing surface of the saddle, for this is the only single point which, being loaded, transmits the pressure equally to the rest of the surface.

2850. Q. Give a practical illustration of this. A. Place a small common table exactly level on sand, grass, or soft ground. Put a weight exactly in the centre of the table, and when measured it will be found, if the surface on which the table stands is equally soft throughout, that the depth penetrated by the feet is equal. Remove the weight towards one end: the pair of feet nearest the weight will penetrate much deeper than the others. Therefore, in order to equalize the pressure, the rider's weight should be placed in the centre of the saddle.

2851. Q. Give an illustration of the result of placing the rider's weight near or on the hinder end of the saddle. A. Place a piece of stout board about two feet long on soft ground. Stand on one end of it, and it will be found that the other end loses contact with the ground and is more or less tilted up in the air: the board has become a lever. Make a motion as if about to jump, but without quitting your position on the board: the board, being out of contact with the ground at the farther end, will be shoved onwards in that direction. This is precisely what happens when a rider sits at one end of the saddle, generally the hinder one: this one is pressed down into the horse's back; the other, generally the front end, is tilted up; and at every movement of the horse and rider the whole saddle is shoved forwards till stopped by the withers, which it will probably wound.

2852. Q. Suppose the saddle placed with its centre exactly over

the combined centres of gravity and motion, and the rider in the centre of it, what would be the results? A. First, an equable distribution of the combined weight of horse and rider on all four legs, both in a state of rest and in action. Second, the movements of the horse, centring in this point, have the least possible tendency to disturb the seat of the rider or the position of the saddle. Third, the weight of the rider, being equably distributed over the whole surface of the saddle in contact with the horse's back, is therefore less likely to injure any portion of this surface, or to convert the saddle into a lever and shove it forwards or backwards.

2853. Q. Suppose the saddle placed as before, but the rider sitting altogether at its rear end, what would result? A. First, the horse's equilibrium is destroyed. Second, the rider himself, being nearer to the hind-legs, will receive an impulse from the direction of the haunches, and be thrown forwards till he meets that coming from the direction of the shoulders; and these two forces, instead of resolving each other from one common point into their sum total, neutralize each other partially in successive shocks at the expense of the horse's legs. The rider transmits the shock from the hind-legs to the fore ones, shoving the saddle forwards, it being impossible to so tighten the girth as to prevent the saddle from tilting up in front. Third, his weight is not distributed equally over the whole under surface of the saddle, and the general result would be, in time, sore back and an unserviceable horse.

2854. Q. With regard to the muscles of the fore and back hand, what should be considered in placing the saddle? A. That it should interfere the least possible with their action.

2855. Q. Explain why this should be so. A. The back is covered with a broad tendon into which the muscles of the fore and back hand are inserted, and on which their contractile action is exercised. The saddle should not extend much, if at all, beyond the limits of this flat tendon, because by doing so it will impede more or less the free action of the muscles, whereas the tendon is rather assisted than impeded in its function by a weight placed upon it.

2856. Q. To what part of the saddle should the girth be attached, and why? A. The centre of the saddle; for if placing the weight in the centre of the saddle has the effect of transmitting an equal amount of pressure to all that part of the horse's back with which the saddle is in contact, attaching the girths so as to act directly on the centre of the saddle will have precisely the same effect; that is, the adhesiveness produced by pressure will be equable throughout, and of course least likely to injure any one particular point.

2857. Q. What is the legitimate use of stirrups besides enabling us to mount horses? A. First, to give the rider lateral support;

second, to enable the rider for various purposes to rise in the saddle by standing in his stirrups.

2858. Q. How do the stirrups give lateral support? A. By offering resistance perpendicularly upwards, while the weight falls in the opposite direction.

2859. Q. How would it be best to fix the stirrups to facilitate standing on them? A. Exactly under the rider's seat; for, putting aside any changes in the position of his own body he may be pleased to make, his weight is transmitted indirectly to the saddle through the stirrups at the same point at which he previously applied it directly with his seat, and the equilibrium is not disturbed.

2860. Q. What would the effect be if the stirrups were fixed far forwards, and the rider far back in the saddle? A. Standing in the stirrups will throw the weight from one end of the saddle to the other, make the saddle press partially on the back instead of equably, which tends to make the saddle shift, and must also alter the equilibrium of the horse, throwing its weight forward, and rendering the animal incapable of turning sharply and handily.

2861. Q. For military purposes, where is it best to place the stirrups? Why? A. Directly under the rider's seat; the cavalry man is often compelled in the use of his weapons to stand in the stirrups. If by so doing the equilibrium of his horse is altered, he to a certain extent disables his mount and himself in the most critical moment.

2862. Q. How should the length of the stirrups be adjusted? A. To adjust the length of the stirrups precisely, the rider should first mount, letting the stirrup-straps loose, shake himself well down into the lowest part of the saddle; then adjust the stirrups to a convenient length, never making them so long as to make the tread on them insecure, nor so short as to allow them to cramp the legs and deprive them of the requisite power of motion.

2863. Q. How does the form of the upper surface of the saddle affect the seat of the rider? A. It has a direct influence on the permanence of the seat. If what may be called the ridge of the saddle be perfectly horizontal, the seat will be determined chiefly by the length and position of the stirrups, because the two surfaces, rider and saddle, are in imperfect contact. It is usual, therefore, to dip this ridge at some point, and spread it out into a more or less concave surface.

2864. Q. What does the form of the seat depend on? A. Altogether on the relative position of the lowest point of the dip. If placed far back the rider will remain there, and if in the centre the seat will also be central; and for military purposes this is its proper position.

2865. Q. What is the general rule governing the influence of the saddle on the seat? A. The larger the surfaces of the rider

and saddle brought into permanent contact, the firmer will be the seat, and the less will it depend on the stirrups or the reins.

2866. Q. What is the general rule for seats? A. The saddle in the centre of the horse's back; the girths, stirrups, and rider in the centre of the saddle.

#### SEATS.

2867. Q. By what means is the seat on horseback maintained? A. By balancing or by friction—that is to say, the greater or less amount of the rider's sitting parts brought into contact with the saddle or by the support given by the stirrups.

2868. Q. What is the best and safest seat? A. It will always be that seat which depends on no one means of support, but uses them all in the best manner.

2869. Q. Give a short discussion of the relative importance of balance or poise as it affects the seat. A. The safety of the horse and stability of the saddle depend to a great extent on the stability of the rider's weight—that is to say, on his poise or balance. This being absent the rider's seat is insecure, more or less shifting, thereby disturbing the equilibrium of the horse, and the rider is liable to a fall. Poise or balance is one of the first essentials of a secure and graceful seat.

2870. Q. Give a short discussion of the relative importance of friction as it affects the seat. A. Friction between two inanimate bodies coming in contact depends, first, on the nature of the surfaces, and, second, on the absolute weight with which the upper one presses on the lower one. In the case of a rider's seat and legs and the saddle, we have a live surface in contact with an inanimate one. The motion of the former surface is attended by muscular action, which forms an important adjunct in increasing the friction, and the amount of this action increases with the surfaces in contact, because a greater number of muscles are brought into action; therefore, too great an amount of the surfaces of the seat and legs cannot be brought into contact with the saddle; the difference between seats being determined either by the proper application of the friction derived from muscular action simultaneously at the same point and in the same direction as that derived by the weight of the rider, or, whether the rider depends first on one and then the other for security.

2871. Q. What is the grand cardinal rule for a good seat? A. From the hips upwards movable, in order to enable the rider to vary his balance or use his weapons; from the knee downwards movable, for the use of the spur and the control of the horse's hind-legs; and between the two points, hip and knee, fixed for the seat.

2872. Q. What is the relative importance of the stirrup as a means of support? A. The stirrups are very subordinate in value to balance and friction taken together, being merely intended to give the rider further aid in addition to that derived from balance and friction.

2873. Q. In addition to the fact that fixing the stirrups directly under the rider's seat favors the equilibrium of the horse, what physiological reasons point to this being the proper place for it? A. The interior surfaces of a well-built man's thighs and legs, from the fork to the heels, are curved in concave or hollow sweeps, that may be varied from the knee downwards by turning the toes more or less outwards. A cross-section of the horse through the fourteenth vertebra coincides very accurately with the sweep of the rider's leg; hence the stirrups hung from a point coinciding with this vertebra favors the greatest possible contact of the entire leg, enabling the rider by varying the curve of the leg to encircle nearly two thirds of the horse. If the stirrups be placed too far forwards, the thighs run diagonally forwards towards the horse's shoulders. A section through this position of the stirrup will show the animal to be narrower at the shoulders than at the section through the fourteenth vertebra, and presents a concave curve to the shoulders, then a convex one over the shoulders. This not being adapted to the sweep of the leg, prevents the desired intimate contact with the horse's body. In addition to the foregoing, the stirrups hung centrally enable the rider to quickly apply the legs so as to promptly control the hind-legs and make the horse place them as desired, whereas when hung forwards the legs are generally applied too late, the rider having to overcome the resistance offered by the stirrup-straps.

2874. Q. In addition to balance, friction, and the proper position of the stirrups, on what part of the buttocks should the rider sit to secure a proper form of seat? A. On the triangle formed by the two lower extremities of the pelvis and the coccygeal bone, the form of seat depending largely as to whether the perpendicular through the hip-bone falls in front or in rear of the lower extremities of the pelvis. In the first case the fork seat is attained; in the other the leg and thigh are thrown forwards and the weight is largely sustained by the coccygeal bone, and the body consequently unsteady.

## BITS AND BITTING.

## GENERAL PRINCIPLES.

2875. Q. To what mechanical contrivance may the neck of the horse be compared as it affects the direction of its motion? A. It may be compared to the tiller of a boat: it is the lever by which the whole animal is steered, or, in a state of nature, steers itself, the reins being the tiller ropes.

2876. Q. On what part of the back does the lever formed by the neck act? A. On that part of the dorsal vertebræ which is the centre of motion: when the horse is in motion, the lever action of the limbs, derived from the muscles, is propagated to this same point, the neck and the tail being the regulators of the movement.

2877. Q. Of what value to the rider is the proper command over the horse's neck? A. Since the neck is used by the animal to adjust its equilibrium according to the degree of velocity required, and according as its motion is on straight or curved lines, proper command over it enables the rider to vary the condition of equilibrium to suit his purpose, and to weight one or both hind-legs alternately or simultaneously, as may best suit his purpose.

2878. Q. Describe briefly the principle upon which the Baucher system of handling horses rested. A. According to Baucher, the power of resisting the will of the rider, and therefore the seat of all restiveness, is located in that part of the neck which forms the articulation with the head. He found that by getting the horse's head into a particular position and fixing it there, he could more or less perfectly master the volition of the animal.

2879. Q. What is the radical defect of this system? A. The horse's neck is the lever by which we obtain a command over the entire motive mechanism of the animal, especially the hind-legs; it is only by varying its position that this can be usefully effected—by suiting this to the pace and the direction of the animal's movements. M. Baucher insisted on one invariable position of the head and neck. The pull on the reins was not in the direction of the centre of motion, and could not act with precision on the hind-legs; finally, the position of the horse's head and neck was such as rather to increase than diminish the overhanging weight of these members. The "handling" was almost all done when the horse was standing still, and its effects either became null when the animal was put in motion, or, if preserved, the power of locomotion was seriously impeded. He overlooked the problem of equilibrium in motion, and mistook diminution or restriction of motive power for a perfect command over it, under all circumstances and at every degree of speed.

2880. Q. What general principle applies to the various purposes horses are put to? A. The whole lever-power of the animal should act in conjunction with its weight in the required direction with such a degree of leaning on the bit that the power of controlling all its motions with certainty and ease is secured, without the necessity of interfering in so abrupt a manner with the animal's efforts as to impede them unnecessarily.

2881. Q. Explain what is meant by the terms "hard" and "soft" mouth. A. When a horse is mounted for the first time, the equilibrium of the whole machine is disturbed, which becomes especially remarkable in the neck. The young horse bores on his bridle and tries to acquire a new point to lean on (he is "hard" mouthed); but when the animal has learned how to carry itself and rider, or acquired an artificial equilibrium suited to the altered circumstances, then it no longer seeks this support, and the mouth is called "soft."

2882. Q. How do you explain the fact that the same horse will go "light" with one rider, and heavy on the bit with another rider? A. It is mainly a question of equilibrium. One rider assumes a seat that favors, another, one that more or less seriously impedes, the efforts of the horse to get into balance. Supposing the seat, so far as the distribution of the weight is concerned, to be identical, the unsteady rider will seek support for himself in the reins, and the horse immediately bores against this and becomes a hard puller, while the steady seat makes a light hand and a "soft" mouth.

2883. Q. Since the direction in which the pull of the reins is made to act on the centre of motion determines both the direction and intensity of the lever-action transmitted in succession to the other parts of the animal's frame, how does this enable the rider to alter the conditions of the horse's equilibrium? A. It is in consequence of this that by merely elevating or depressing the hands, employing a certain amount of pressure with the rider's legs, and throwing his weight backwards or forwards, it becomes possible to make the horse alter the conditions of his own equilibrium by bringing his hind-legs more under him, or the contrary. In like manner, it is possible, supposing the pull to be horizontal,—which is the normal direction for a well-set-up cavalry horse,—to concentrate the lever-action on one of the hind-legs in preference to the other by simply throwing the rider's weight slightly to the same side, which enables him to fix certain legs to the ground, or detain them longer in contact with it, setting the others free, and determining with accuracy the mode and the moment of their employment.

2884. Q. Why is the art of biting and bridling a very useful and essential one in horsemanship, and in what does it consist? A. It enables us to avoid the infliction of pain, while it secures to us a perfect control over the horse's movements. It consists

in enabling us to exercise the mechanical action of the reins in a proper degree, and the right direction for every horse and for every movement.

2885. Q. What is the influence of good and careful biting on cavalry? A. The steadiness of a troop or squadron in its evolutions, and especially in skirmishing, charging, and rallying, depends mainly on it—doing largely away with bolting and restiveness.

#### THE NECK—THE HEAD—THE MOUTH—THE TONGUE—CARRIAGE.

2886. Q. Describe the qualities of a well-shaped neck as regards lever-action. A. The horse's neck forms a double curve, one being turned upwards, the other downwards; the mechanical action results in a straight line forming the axis of the whole. A well-shaped neck, well clothed with firm muscles, possesses both straightness and inflexibility sufficient to render it possible to apply to it the theory of lever-action with perfect propriety. Such a neck will only deviate from the straight line to any considerable amount near its point of junction with the head; this latter acting as a lever, and imparting to the whole that graceful curvature which is evidence of perfection of equilibrium and power.

2887. Q. State the principle on which the effect produced by a lever depends, and apply it to the horse's head considered as a lever acting on the neck. A. The effect produced depends not only on the absolute power applied, but also on the direction in which this is done. Considering the horse's head as a lever which is to act on the neck and bring it towards the rider's hand, it is evident that if the head be stretched out so as to form a continuation of the neck, there would be no lever-action. In the same manner, if the horse's chin could be brought under so as to touch his neck, there would be little, if any, lever-action. The lever-action is greatest when the head is at right angles with the neck; the more it departs from this line, either forwards or to the rear, the less will be the useful lever-action on the neck.

2888. Q. How may the depth of the jaw-bone, measured perpendicularly to the forehead on the line passing through the eyes, interfere with the proper position of the horse's head? A. This depth may be so great that, if coupled with a coarse, fleshy, short neck, the angle of the jaw coming in contact with the latter, a jam ensues before the head can be brought round to the proper angle.

2889. Q. What is the effect on the proper position of the head when the jaws converge inwards? A. The space contained between being narrowed in prevents the neck fitting properly in the cavity to some extent, as it would in a perfectly well-shaped head,



limiting the angle of flexion, and offers a serious impediment to the breaking-in and biting of the animal.

2890. Q. Describe the glands lying under the angles of the two jaws, and explain how they may influence the position of the head and actions of the animal. A. There are certain glands in the neck lying under the angles of the jaw, which run up in the direction of the ear. They are the seat of "strangles." It is not unusual among the common breed of horses to find these glands large and flabby in texture. Sometimes their abnormal size is constitutional—sometimes, the consequence of disease, usually "strangles;" and sometimes it arises wholly from the pressure of the angles of the jaws, especially when these lie too close together, and the rider has attempted to force a certain position of the head by the use of severe bits. Undue pressure on these glands is attended with more or less pain and discomfort to the animal, and owing to their intimate connection with the eyes, both by absorbent vessels and the nerves, undue pressure, it is said, has caused many cases of premature blindness in young animals. The glands are sometimes affected on one side, in which case the animal exhibits what is called one-sided restiveness—obeying willingly on the side not affected, and refusing on the affected side.

2891. Q. Describe what is known as the chin-groove as regards biting. A. The lower lip is covered with a very thick skin, underneath which lie the roots of the beard, fat, and membrane; this structure is continued up into a certain depression above the chin, known as the chin-groove. The bone immediately beneath the thick and very sensitive skin of the chin-groove is flat and rounded off in all directions, being that point where the two branches of the jaw begin to unite together. A considerable amount of pressure may be applied by a properly fitting curb-chain or strap at this point, without causing any very unpleasant sensation to the horse. Passing the finger upwards along the jaws from this point, it will be found that both the character of the bone and that of the skin covering it have become very much changed; the former has sharp edges covered by very sensitive skin, so that a very slight pressure of this thin skin on the sharp edges of bone causes very considerable pain. In biting, these peculiarities must be borne in mind, and due allowance made for them.

2892. Q. What three dimensions of the interior of the horse's mouth must be accurately ascertained before fitting him with a proper bit? A. First, the transversal width of the mouth from side to side, measured at the same height as the chin-groove, and including the thickness of the lips. Second, the width of the channel in which the tongue lies, or the distance between the two bars internally. Third, the height of the bars—that is to say, the distance between a straight edge supposed to rest on the upper

surface of the bars opposite the chin-groove, and another placed exactly parallel to it, and touching the undermost point of the chin-groove.

2893. Q. What dimension of the bit are determined by the transversal width of the mouth? A. The width of the mouth-piece, which must be made to fit exactly; for if too narrow the lips are compressed and subject to injury, and if too wide the bit slips from side to side, displaces the post from its proper position, causing the corners of the post to wound the bars.

2894. Q. What dimensions of the bit is determined by width of the tongue-channel? A. It determines how much of the mouth-piece may be allowed for the post, the remainder being reserved for action on the bars.

2895. Q. What dimensions of the bit are determined by the height of the bars? A. All the remaining dimensions; that is, the length of the upper and lower cheek, and curb-chain or strap.

2896. Q. What kind of quantity is the width of the mouth? A. It is a variable quantity, depending on the breed and sizes of the animals, and should be invariably determined for each horse.

2897. Q. What proportion does the width of the tongue-channel bear to the height of bars? A. It is nearly always three fourths the height of the bars.

2898. Q. What has been found to be the average height of the bars, and what part of the bit should never exceed it? A. One and one eighth inches. The upper cheek of the bit should never exceed it."

2899. Q. Are the shape and texture of the bars of the mouth uniform? A. There is great diversity in their shape and texture, some being flat-topped and broad, others presenting a ridge-like surface; some also spongy, soft, and comparatively devoid of feeling, while others appear firmer, finer, and more sensitive—all this exercising an immense influence on the biting.

2900. Q. What is the width, in inches, of the channel for the tongue? A. It is pretty nearly three fourths of the height of the bars; and this being very constantly one and eight tenths inches, the other will be about one and one third inches, which gives the maximum width of the post.

2901. Q. Suppose the mouth-piece to have the proper width, what would be the effect of having a post too wide? A. If the post be wider than the lingual canal, at every pull of the reins its corners will come on to the bars, either on one side or the other, producing much pain—all of which is wholly inconsistent with good biting.

2902. Q. Discuss the influence of the texture or form of the tongue on biting. A. This organ varies very much both in thickness and texture. In some horses it just fills its own canal neatly, rising towards its axis in a gentle curve, whose summit is two tenths to three tenths of an inch above the level of the bars;

in others it seems much too thick and fleshy for the interior of the mouth, and projects in all directions. The volume of the tongue is a matter of much importance, because the action of the mouth-piece is divided between this organ and the bars of the mouth; and the great nicety in biting is practically to determine for each individual horse how much of the lever-action is to fall on the tongue and how much on the bars.

2903. Q. What should the carriage of the cavalry horse be? A. That position of the head is best with which the horse's paces are clean and free—which allows him to turn willingly and without an effort or disturbance of his pace; to diminish or increase the pace without hesitation; to rein back, preserving a proper degree of feeling, and immediately to advance again freely if called upon to do so.

2904. Q. What is meant by the paces being "clean" and "free"? A. To be clean, they must be equable and their rhythm perfect; to be free, they must be made without apparent effort or marks of distress.

2905. Q. Is the carriage of the horse the result of biting alone? A. It depends on a judicious system of saddling, packing, and riding—the biting completing the whole.

2906. Q. What qualities possessed by the internal conformation of the mouth would indicate naturally a "soft" mouth? A. A thin tongue, high and sharp bars, a wide tongue-channel, and fine lips; the tongue filling up its channel nearly to the brim, and projecting only a few lines over the surface of the bars, permitting the mouth-piece to exert a certain degree of pressure on the bars.

2907. Q. What qualities possessed by the internal conformation of the mouth would indicate a naturally "hard" mouth? A. A thick, fleshy tongue, not only totally filling up its channel, but protruding over it, and rising above the level of the bars; a flat surface to the bars, and thick, fleshy lips, in which case pressure of the mouth-piece is mainly spent on the tongue and lips.

#### THE CAVESSON—SNAFFLE—NOSE-BAND —TRAINING-HALTER— RUNNING REINS.

2908. Q. Of what value is the cavesson in training remounts? A. It is used with the longe to teach the young horse to go forward; to supple and teach him the proper use of the legs. It thus aids in forming his gaits and in fitting him for the cavalry service. (U. S. Cavalry Drill Regulations.)

2909. Q. Describe the cavesson and longe. A. It is a light halter with the brow-band, throat-latch, and cheek-pieces like the bridle head-stall, and has a nose-band that may be adjusted

with a buckle ; there is also a running-ring on the chin-strap for the longe. The longeing-strap is from twenty to thirty feet long. The lariat may be used. (U. S. Cavalry Drill Regulations.)

2910. Q. How is the cavesson fitted to the horse ? A. The cavesson is put on after the snaffle has been fitted ; the nose-band should be placed about three inches above the nostrils, so as not to affect the breathing ; it should act both as a nose-band and curb, and be over the snaffle. It must not be buckled so tightly as to make the horse uneasy. (U. S. Cavalry Drill Regulations.)

2911. Q. What is the danger attending a too sharp pull on the cavesson ? A. Young horses are in danger of being spavined by applying the lever-action of the neck too suddenly on the hind-legs.

2912. Q. Describe the manner of using the cavesson and longe in the early lessons of the young horse. A. The lesson is begun on a circle from fifteen to twenty feet in diameter. As horses are usually handled on the left side more than on the right, it will be found necessary to give two lessons on the right to one on the left. If the horse stands still, he should be encouraged to move on, as this hesitation is oftener the result of fear or ignorance than disobedience or vice. At first the horse is led around the circle several times at a walk. A man with a whip follows at a short distance, and shows the whip whenever the horse hangs back ; if this does not produce the desired effect, he should strike the ground in rear of the horse, or touch him lightly with it until he obeys. When he moves freely at a walk, he should be gently encouraged to trot, the man gradually paying out the longe until he stands in the centre of the circle, and has merely to turn in place. The horse should be frequently halted by gently feeling the longe, and urged to move forward again. He should be frequently brought to the centre of the circle, caressed, and the lesson repeated. The first lessons should be short, so as not to fatigue or bore the animal. (U. S. Cavalry Drill Regulations.)

2913. Q. What is the value of the snaffle in training remounts ? A. The great value of the snaffle is that by its use the horse acquires confidence and insight into the means by which the rider proposes to direct its motions. He willingly assumes a steady and regular feeling, the action of the mouth-piece being gentle and capable of gradation ; and in consequence of its acting on nearly the same part of the mouth as the curb-bit, it becomes the best preparative for the curb-bit.

2914. Q. What is the best form of snaffle to employ in the training of remounts ? A. A snaffle, which is neither too long, too thin, nor too much curved, and with only one joint in the middle.

2915. Q. What would be the effect of a snaffle whose mouth-piece

was two straight pieces of iron, jointed in the middle and equally thick throughout? A. The pressure, with most horses, would come to act on the tongue exclusively, and the bars of the mouth remaining untouched, there would be scarcely any action.

2916. Q. What general shape is given to the mouth-piece of the snaffle? A. It is usual to make each half of the mouth-piece thicker toward the cheeks, and tapering off finer to the joint connecting them, by which means a portion of the pressure is transferred from the tongue to the bars; and, in addition to this, they may be slightly curved, which has the same effect.

2917. Q. Is power gained by making the mouth-piece of the snaffle very thin in the centre and very thick on each side, and why? A. Practically, very little, if any; because, although a greater amount of action is transferred from the tongue to the bars, the thick portion of the iron acting on the bars produces comparatively little impression.

2918. Q. What is the action of a snaffle whose mouth-piece is equally thick throughout, but much curved, and projects an inch or more at each side? A. The action, while increased, is in a wrong direction; instead of being a fore-and-aft pull it is converted into a pincer-like twitch on the lower jaw, which becomes so painful that restiveness is likely to result.

2919. Q. Describe the double-jointed snaffle and its action. A. It consists of a double mouth-piece, the joints being placed right and left of the centre; it acts with a pincer-like twitch, and its general use is not recommended.

2920. Q. Describe the training-halter invented by Lieut.-Col. Olynhausen of the Austrian cavalry. A. It consists of two cheek-straps whose upper ends are made fast in the buckles of the snaffle head-stall. These cheek-straps support by means of two rings a nose-band composed of three pieces: 1. The nose-band proper; 2. A strap about seven inches long, sewed into the ring on the off side; and, 3. A shorter strap, two to three inches long and terminating with a buckle, which is sewed into the ring on the near side. The cheek-straps are buckled into the head-stall outside, so that the nose-band comes to hang below the rings of the snaffle, and the two back-straps are then buckled together, so that the longer one comes to lie in the chin-groove, as a curb would with a bit, leaving a sufficient play to the horse's under-jaw without allowing the animal to open it beyond a certain distance, and thus securing perfect independence to the mouth-piece and permitting its acting in the proper place and direction.

2921. Q. Of what value is the training-halter in the first handling of remounts? A. It enables us, by preventing the young horse from escaping the action of the light snaffle-mouth-piece, to avoid the necessity for employing sharper ones; in fact, all violent measures are thereby rendered unnecessary during the

earlier period of training, and it prepares the mouth for the reception of the plain snaffle or curb-bit.

2922. Q. Where should the mouth-piece of the snaffle be placed in the horse's mouth? A. About one fourth of an inch below the angle of the mouth; in this position it does not interfere with the tusks or front teeth, nor does it draw up the corners of the mouth.

2923. Q. What are running-reins? A. An arrangement made of buckles and straps, by which the horse's head may be made to assume any position desired in a vertical plane through the spinal column.

2924. Q. What is the best form of running-rein? A. That one which acts directly on the bit or snaffle, and is wholly independent of the reins, and affords a facility for adjusting its action without altering either buckle or strap.

2925. Q. Describe Seeger's running-rein. A. It consists of three distinct pieces: the chin-strap, the running-rein, and the martingale. The chin-strap consists of a leather curb furnished at each end with a small buckle and strap, and is attached to the cheek-rings of the snaffle. The curb carries a rounded strap in rear, supporting an ivory ring, whose internal diameter is about one inch, the external one being one and five eighths inches, making the ring about one half inch thick. The running-rein is an ordinary rein eight and one half feet long. The martingale is an ordinary one but with a single ring, the strap being about one inch wide; the ring being about one and one half inches internal diameter and three fourths of an inch thick. An ordinary neck-strap carries the martingale.

2926. Q. How is the running-rein adjusted on the horse? A. The horse is saddled, and bridled with a plain snaffle-buckle, the chin-strap of the running-rein into the rings of the mouth-piece; run the girth through the loop of the martingale and adjust its length so that the ring may be on a level with the points of the shoulders; buckle one end of the running-rein to the near pommel-ring of the saddle, thence carry it through the martingale-ring from rear to front, and through the curb-strap ring from left to right; back again through the martingale-ring from front to rear, whence it goes to the rider's right hand.

2927. Q. Describe the action of Seeger's running-rein. A. A pull on the running-rein acts directly on the mouth-piece of the snaffle, drawing it back and somewhat downwards towards the horse's breast-bone; by taking the running-rein and right snaffle-rein into the right hand and the other snaffle rein into the left, the horse's head can be placed in any position desired; the pull being exercised on the horse's mouth either horizontally, upwards, or downwards.

2928. Q. What is the main value of all such contrivances as the training-halter and running-rein in the handling of horses?

A. They enable us to accomplish the object sought for gradually and noiselessly, as it were, with perfect certainty, and afford us the means of avoiding all unnecessary violence or any approach to ill treatment.

#### THE LEVER—THE BIT AND CURB—BITTING—THE BRIDLE.

2929. Q. Discuss the subject of levers of the first and second order with reference to the curb-bit. A. In a lever of the first order the power is applied at one end, the weight at the other, and the fulcrum between the two. The power obtained is proportionate to the relative lengths of the two arms. In this case the power and weight move in opposite directions, rotating around the fulcrum. Applying this principle to the curb-bit, the power acts at the rings of the bit in the direction of the hand; the fulcrum is the mouth-piece of the bit; then the pressure of the curb on the chin would represent the weight to be raised. But, since the power and weight move in opposite directions about the prop, the horse's chin, in consequence of the pressure exercised by the curb, should move forward—that is to say, away from the rider's hand. And the greater the lever-power of the bit, so much the more would the horse be induced to stick out his nose, which is the reverse of the action desired in a good bit. In a lever of the second order, the power and fulcrum are placed at its opposite extremities, the weight between them. The mechanical advantage is proportioned to the relative distances of the power and weight from the prop, the power and weight moving in the same direction in rotating around the fulcrum. This is what is wanted for biting; the weight in this case is represented by the pressure on the bars of the mouth, the curb acting merely as a fulcrum; the horse's head follows immediately the pressure on the bars in the direction of the rider's hand.

2930. Q. How does the horse discover, from the action of the bit, the direction in which his head should be moved? A. The relative amount of painful pressure exercised by the mouth-piece on the bars and the curb-strap in the chin-groove—the animal deducing from the balance of pain what the rider's will may be—if the bit is properly constructed.

2931. Q. From what point of the mouth-piece is the relative length of the upper and lower branches of the bit measured? A. From the axis of the mouth-piece in that form of mouth-piece which consists of a post and two lateral straight portions. If the mouth-piece forms one curve, then from the line of bearing—that is to say, the line connecting the two points of the mouth-piece which rest on the bars of the horse's mouth.

2932. Q. What determines the length of the upper cheek of the bit? A. Taken from the "line of bearing" to the point at which the curb-hook acts, its length should be equal to the height of the

bars of the horse's mouth, which has been found by observation to be very nearly a constant quantity, equal to about one and three fourths inches.

2933. Q. When is a curb-bit said to "fall through," and when to "stand stiff"? A. When the curb is so loose as to permit the branches of the bit to lie in a line with the reins, there being no lever-action, the bit is said to "fall through." When the curb is so tight as to prevent the branches from revolving a certain number of degrees around the mouth-piece, it is said to "stand stiff." Good biting will be equally removed from stiffness and falling through; it lies between the two extremes.

2934. Q. What is the rule governing the length of the lower cheek of the bit? A. The lower cheek should be twice as long as the upper one.

2935. Q. In what proportion is the lever-action increased by making the length of the lower cheek twice as long as the upper cheek? A. Three to one.

2936. Q. What error do bit-makers generally fall into in constructing bits? A. While generally adhering to the rule that the lower cheek should equal twice the upper cheek, not having a standard for the length of the upper one, they generally make the lower one too long.

2937. Q. Since the upper cheek should be equal in length to the height of the horse's bars, what would in general be the length of the lower cheek? A. Three and one half inches.

2938. Q. What would be the entire length of the bit? A. Upper cheek  $1\frac{3}{4}$  in. plus lower cheek  $3\frac{1}{2}$  in.—equal to  $5\frac{1}{4}$  in.

2939. Q. Between what points is the length of the bit measured? A. From the point where the curb-hook acts to where the lower ring acts.

2940. Q. What would be the minimum length of a bit suitable for small horses or large ponies? A. Four and one half inches.

2941. Q. What is the proper position of the curb? A. The curb must lie in the curb-groove, without any tendency to mount up out of it on to the sharp bones of the lower jaw, when power is applied to the reins; otherwise it ceases to be a painless fulcrum, and renders the best-constructed bit uncertain, or even still worse in its action.

2942. Q. What is the best manner of attaining the painless action of a curb in a properly constructed bit? A. By placing the mouth-piece of the bit on that part of the bars exactly opposite to the chin-groove.

2943. Q. Are the "tusks" found always in the same relative position in all horses' mouths, and would they afford a good point from which to measure the position of the mouth-piece in the horses' mouths? A. There is great irregularity in their position, some horses having them relatively higher than others; nor do the "tusks" of the upper jaw always correspond with those of the



lower; mares have very frequently no tusks whatever. It is, therefore, quite impossible to determine the proper place for the mouth-piece with reference to these teeth.

2944. Q. Discuss the relative value of the curb made of a double chain, worked flat, and one made of leather. A. The chain-curb, provided it does not overtwist and is exactly of the right length, is the best kind of curb. A leather curb would be in some respects better than a chain; it is, however, not only perishable, but also subject to stretch or contract when exposed to moisture, and after having been once or twice thoroughly soaked, becoming hard and inflexible, it is more likely to injure the horse's chin than a well-made chain.

2945. Q. What should be the width of the curb-chain or strap? A. It should not be wider than is necessary to nearly fill up the chin-groove. If too narrow, it may cause more or less pain from pinching or cutting; if too wide, its edges may wound the bones of the jaw above the chin-groove, and consequently impair the action of the bit. It should fit the chin-groove snugly and evenly, so as to distribute the pressure on it equally at all points of bearing.

2946. Q. To what two dimensions of the mouth should the length of the curb-strap bear a certain proportion? A. The width of the horse's mouth and the height of the bars.

2947. Q. What is the proper length of the curb? A. About one fourth more than the width of the mouth, the curb-hooks not being included; or, including the hooks, once and one half the same dimensions.

2948. Q. Where curb-hooks are used, what would be their proper dimensions? A. Three fourths the length of the upper cheek, or about one and one fourth inches.

2949. Q. Of what importance is the mouth-piece of the bit, and where should the entire action of the bit be concentrated? A. It is the part of the bit through which the immediate impression is made on the mouth, and the entire action of the bit should be concentrated upon it.

2950. Q. What should the operation of the curb of the bit be confined to? A. It should be wholly confined to the function of a painless fulcrum.

2951. Q. From what is the form and proportions of the mouth-piece deduced? A. The form and proportions of the mouth-piece must be deduced wholly from the interior conformation of that part of the mouth on which it is intended to act; and these are the tongue in the centre and the bars of the mouth on each side.

2952. Q. Discuss the form of the mouth-piece with regard to the relative "hardness" or "softness" of the mouth, and explain how it affects the art of biting. A. Relative "hardness" or "softness," so far as this depends on the conformation of the mouth itself, is a consequence of the greater or less thickness of

the tongue, and the greater or less sharpness and sensitiveness of the bars. The soft, fleshy tongue being less sensitive to pressure than the sharp long bars, a perfectly straight, unjointed mouth-piece resting wholly on the tongue would, notwithstanding a certain amount of lever-action, be the very lightest form of bit that could be devised—a good snaffle bit being more effective. If by means of a “port” or passage for the tongue, all pressure be removed from the tongue and brought on the bars, we obtain, with precisely the same amount of lever-action as before, a much greater amount of power, the painful action being wholly transferred to the bars—the art of biting consisting, so far as the mouth-piece goes, in determining how much of the pressure shall fall on the tongue and how much on the bars. Consequently, by a system of gradations, we are enabled to obtain exactly the degree of action required in each particular instance by the nature of the service we demand, whatever the relative thickness of the tongue and sensitiveness of the bars may chance to be.

2953. Q. What rule governs the construction of the mouth piece of the bit? A. The first rule must be, in all cases, to make the mouth-piece precisely so wide that, when placed in the mouth, it fits close to the outer surface of the lips without either pressing on these or being subject to be displaced laterally, and the width of the port exactly that of the tongue-channel.

2954. Q. What is the injurious effect of a badly fitting mouth-piece? A. If the mouth-piece be too wide, a very slight pull on one rein will suffice to displace it, so that the bar of the mouth at that side gets either altogether under the port, in which case the whole pressure is thrown on the tongue, or partially so, when the corner of the port will, by being pressed into it, cause great pain; in fact, the action of the mouth-piece, whether with or without a port, becomes altogether irregular, and cannot be depended on. If the mouth-piece be too narrow, the lips are jammed in over the bars, the mouth-piece rests more or less on them, and the whole action is disturbed, besides which, the horse is sure sooner or later to get ulcerated lips.

2955. Q. What width is commonly given by bit-makers to the port of the bit? A. The common practice seems to be to make it one third of the total width of the mouth-piece in all cases.

2956. Q. What would be the maximum width of the port, where the total width of the mouth-piece amounts to four and three fourths and five and one tenth inches? A. About one and one third inches.

2957. Q. State the different conditions which govern the height of the port of a bit? A. The height of the port is the most variable dimension of all, depending on the relative thickness of the tongue and sensitiveness of the bars, on the temperament and general conformation of the animal, on the description

of service to which it is to be applied, and in some cases the peculiar style of riding of the individual who uses it.

2958. Q. What is the greatest height that can be properly given to the port of the bit? A. A height equal to its width, that is to say, one and one third inches.

2959. Q. What is the effect of giving a port a height greater than its width? A. The slightest pull on the reins would, by altering the position of the lever, bring the top of the port to press against the palate, causing more or less pain, and therefore inducing the horse to bore with its head in the contrary direction to the pressure—that is, away from the rider's hand.

2960. Q. Discuss the effect of increasing or decreasing the diameter of the straight portion of the mouth-piece on the action of the bit. A. The diameter of the straight portion of the mouth-piece may vary from half to three quarters of an inch, and its action on the bars will vary with its thickness: when under half an inch it pinches to a certain extent, and should only be employed when quite certain that this is desirable. A greater thickness of the mouth-piece adds to the height of the port, and renders the action on the bars less painful, and enables us to meet the exigencies of special cases, as for instance where a horse has a thick, fleshy tongue and very sensitive bar, and would not bear anything like sharp biting.

2961. Q. What is the effect of inclining the port of the bit a little forward to the plane of the bit? A. It increases the tongue freedom without making the port itself higher; this can only be done with a port of very moderate height, else the roof of the palate may be endangered.

2962. Q. What is the supposed use of rings or other devices fastened to the port of a bit? A. They are supposed to prevent the horse from seizing the bit between his grinders, and thereby neutralize the lever action; they are also very useful with what are called "dead mouths," and favor the very desirable process of "champing the bit."

2963. Q. Give a summary of the fixed dimensions of a properly constructed bit. A. The average height of the bar of the horse's mouth being one and three quarters inches, then upper cheek is equal to it; lower cheek is equal to twice the length of upper cheek, that is, three and one half inches: making total length of cheek-pieces five and one quarter inches, measured from curb-hook to lower rings.

2964. Q. What is the value of the nose band with young animals? A. It prevents the animal from opening its mouth too wide, and bolting the bit, or catching hold of it between its teeth; in fact, evading its action one way or the other.

2965. What is the proper position of the nose-band on the horse? A. It should be adjusted so as to fall just across the nose at the point where the bone ceases and the cartilage com-

mences, and it should always be buckled so lightly as to admit of a proper amount of free motion.

2966. Q. What is the rule for properly placing the bit in the horse's mouth? A. The head-stall of the bridle should first be carefully fitted to the animal's head by means of the upper-cheek strap-buckles; and the bit should be adjusted by the lower buckles of the cheek-strap so that the mouth-piece shall come to rest on the bars of the mouth exactly opposite the chin-groove, unless some irregular disposition of the "tusks" should render this impossible, in which case it must be moved only just so much higher as is absolutely necessary to clear the obstacle. The curb may then be hooked in.

2967. Q. How tight should the curb be fastened? A. There should always be room for the first and second fingers of the right hand to pass flat between it and the chin, and by gently pulling the reins with the left hand, whilst the two fingers of the right are in this position, it will be easy to ascertain whether any pinching action occurs, in which case there is sure to be something wrong.

2968. Q. What is the best way to determine the proper length of curb for each horse? A. If after buckling the curb-strap it is found on gently pulling on the reins that the bit stands "stiff," the curb will be too short, and on the pressure being increased the horse will almost entirely either turn his mouth askew, or bear back suddenly to escape it altogether; we therefore loosen the curb a little. Drawing the reins gently as before, we observe whether, after the lower bar moves through an angle of about eight degrees, the horse gives his head gently and gradually in the direction of your hand as it increases the pressure without either poking his nose or shrinking back. If this is the case, the curb-strap is properly adjusted, but if the lower bar moves through a much greater angle than eight degrees, say fifteen to twenty, before the horse yields perceptibly, then the curb will probably be too long.

2969. Q. What are the characteristics of good biting, and what are the results? A. Lightness, accuracy, easy motion, a total absence of stiffness, constraint, or painful action; and if these be attained, ready obedience to the rider's hand and heel will be the result.

#### TAKING MEASURE FOR THE BIT—THE MOUTH-GAUGE—THE TRIAL-BIT.

2970. Q. What is the manner of measuring the width of the mouth with a bit and rule? A. Put the bit into the horse's mouth, hold it gently up to one side of the mouth, measure off with a small rule, divided into inches and eighths or tenths, how much of the mouth-piece, if any, protrudes beyond the side of

the lips on the other side; deduct this amount from the actual dimensions of the mouth-piece, and the remainder is the width of the mouth.

2971. Q. What is the value of the "mouth-gauge" invented by Von Weyrother? A. It is an instrument for accurately measuring the width of the mouth and height of the bars; and is of much assistance in enabling one to select a proper bit for each animal.

2972. Q. Describe the "mouth-gauge" invented by Von Weyrother. A. It consists of four pieces, namely, a graduated mouth-piece; a fixed cheek-piece; a sliding cheek-piece graduated into inches and eighths or tenths of inches, provided with a set-screw for fixing it, where required, on the mouth-piece; and attached to this sliding cheek-piece is a sliding-rod graduated in the same manner, which by means of a screw can be fixed to the cheek-piece at pleasure.

2973. Q. How is the width of the mouth taken with Von Weyrother's "mouth-gauge"? A. Place the mouth-piece in the horse's mouth opposite the chin-groove, hold the fixed cheek-piece gently up to the off side of the mouth, slide the movable one up to the lips on the near side without displacing them, clamp the sliding cheek-piece, remove the gauge, and read off the dimension required on the mouth-piece.

2974. Q. How is the height of the bars measured by the mouth-gauge? A. Adjust the instrument at the proper width of the mouth, place it in the mouth opposite the chin-groove but underneath the tongue, turn it around on the mouth-piece until the upper limits of the cheek-pieces stand nearly perpendicular to the general line of the nose, push the movable rod along the sliding cheek-piece until it is tangent to the chin-groove, then clamp, remove the sliding cheek-piece, and read off the height of the bar.

2975. Q. Describe what is known as the "trial-bit." A. It is an adjustable bit, which enables one to practically ascertain the proper bit for each individual horse. It consists of a certain number of spare mouth-pieces which may be fixed in succession into the side-pieces of the bit, their width being adjusted by means of a number of small plates one tenth of an inch in thickness, removable at pleasure from inside to outside of the side-pieces, this giving the width of the mouth. Having determined the height of the bars, the movable ring-pieces of the upper cheek-piece are moved up to correspond. The sliding ring-pieces of the lower cheek-piece, in which the reins are buckled, are moved up or down till the proper proportional length of the lower cheek has been attained. The adjustment is altered to suit the circumstances of each case until, by actual trial, a certain one is found which will give the desired result.

## THE ANGLE OF TRACTION.

2976. Q. What is the point of traction with harnessed animals?  
A. The trace-hooks.

2977. Q. What is the angle of traction? A. The angle made with a given plane by the line of direction in which the power acts.

2978. Q. What is the general mathematical rule for the best disposition of the traces in draught, and why? A. When they are perpendicular to the collar, for a horse will apply a greater amount of force to the trace when the collar neither causes him pain nor interferes with his muscular action than in the contrary case; therefore a greater useful effect may be attained with traces that are so disposed as to enable a horse to exert its entire strength under a theoretically less favorable angle of traction than when the ease of the animal is sacrificed to a correct, but in such a case inapplicable, mathematical principle.

2979. Q. How should the angle of traction be regulated? A. It should be regulated with reference to the horse, and not to the carriage exclusively.

2980. Q. What is the essential point with regard to the position of the traces? A. That the trace should be perpendicular to the horse's shoulder-blade, through which the effort is exerted, and whose form cannot be altered, and not to the collar, which may be made of variable thickness.

2981. Q. What is the reason for a value attaching to a long shoulder-blade in a draught-horse? A. Because the larger the arms of the lever above and below the fulcrum the more powerful will be the action.

2982. Q. What is the effect of breast harness or the attachment of the trace too low down on the hames? A. It has the effect of bringing the pull opposite, or nearly so, to the articulation of the shoulder-blade with the arm-bone, and is therefore analogous to a man running a race in a sack.

2983. Q. Where should the trace be attached? A. Opposite to the immovable point of the shoulder-blade, where it would not cause the slightest inconvenience.

## THE COLLAR.

2984. Q. At what point of the collar should a trace be attached, in order to derive the greatest amount of pulling power? A. Injury to the neck and shoulder is best avoided by getting the pull from the middle of the collar, for the reason that the pressure is then distributed over the whole surface, instead of being concentrated upon a point.

2985. Q. What is the ordinary effect produced by having the pull below the middle of a collar? A. The pull on one end of

the collar will cause it to gape away from the horse's neck at the other end and grind up or downwards. If the pull on the collar occurs in an upward direction, the lower part of the collar is pulled against the horse's windpipe, and chokes him more or less; and if in a direction downwards, then it wounds the withers.

2986. Q. What portion of the collar should be the widest? A. The base, which should be from one to one and one half inches wider there than anywhere else.

2987. Q. How should a collar be fitted to a horse? A. Not only should it be adjusted to the horse's neck and shoulders when standing, but the horse should be put into action, because the shape and dimensions of the neck and shoulders are wonderfully altered in some horses when they are put in motion.

#### THE HAMES.

2988. Q. What is the most desirable method of attaching the trace to the hames, and what objection is there to it? A. The trace, whether a chain, or cord, or made of leather, working directly in the draught-eye of the hames. The only objection it has is that the friction of the trace, as it changes its position up and down, chafes the outer side of the collar and wears it out.

2989. Q. What is the difference between the construction of hames on rules laid down by mathematicians and that of harness-makers? A. The former insist on the trace being adjusted so as to work horizontally, while the constructors of hames place the bar or the scroll as if the pull were to be exerted at right-angles to the leg of the hames, through this to the collar, and finally to the horse's shoulder-blades.

2990. Q. Why is the hames-maker's principle the correct one? A. As the horse's shoulder-blade is never (or at least only in very miserably-built horses) quite perpendicular, it follows that the horizontal trace must always act at an angle on the bar or scroll, instead of on the prolongation of their axis.

#### THE TRACE.

2991. Q. What advantages are derived from harnessing horses near to their work? A. Where roadways are good, it is desirable to do so when work is to be done on crowded thoroughfares with frequent stoppages and sharp turnings. Even for military purposes there is an advantage in making the teams as short as is otherwise consistent with the ease of the horses, because the length of the columns is thereby kept within limits.

2992. Q. Does the short trace confer a greater mechanical advantage on the motor (horse) than a longer one? A. The contrary may be the case, for the angle of traction may be made more favorable with a long than with a short trace. The well-

known advantage of applying force as near as possible to the centre of gravity of the object to be moved depends to so great an extent on the possibility thereby acquired of avoiding waste of power by the force being exerted at a wrong angle, or in a wrong direction, that this consideration (the angle or the direction) becomes the principal one.

2993. Q. What lesson is taught by the fact that over-fatigued or over-weighted draught-horses put their heads together and pull towards a central line? A. That in carriage-draught the inclination of the traces to the longitudinal axis of the vehicle cannot safely be neglected.

2994. Q. Why is it that considerably greater weight per horse may be calculated on for teams of four than for those composed of six, eight, or twelve horses? A. Because there is always difficulty in getting the increased number to act simultaneously and in the proper direction.

2995. Q. Are short traces an impediment to draught? Not in themselves, if the construction of the horse and that of our carriages and the mode in which the horse is necessarily attached to them did not create obstacles that must necessarily be surmounted at the expense of the horse's legs.

2996. Q. What advantage does a long trace possess over and above a short one? A. The longer the traces up to a certain point, the more nearly will the lines which they describe correspond with the line of traction, and therefore the more usefully will the power be employed; they prevent sudden lateral shocks to the collar, the whole weight of which falls on the fore-legs, and nothing wears or fatigues a horse more than this.

#### THE LENGTH OF THE POLE AND POLE-CHAINS.

2997. Q. What does a longer trace necessarily involve regarding the pole of a vehicle? A. The longer the trace the longer must be the pole, as the end of the latter should always project to a certain extent beyond the horse's chests.

2998. Q. What is this certain length of pole, and why should it be so? A. When the end of a pole projects but very little beyond the line of the horses' chests, the animals must, when suddenly called upon to stop, inevitably throw out their croups to the side, which when carried to excess is unsightly; whereas by prolonging the pole they reduce this outward movement of the croups.

2999. Q. As gentleman's carriages and the like are used with short poles, how is the necessity for the long pole overcome? A. By putting a cross-tree at the head of the pole; to each end of which the pole chain or strap is attached.



## THE HEIGHT OF THE WHEEL.

3000. Q. Regarding the wheels of a vehicle, how would draught of the vehicle be easiest? A. If the axles were placed on a level with the trace-hooks or point of traction, the trace itself being also horizontal.

3001. Q. Although the principle of high wheels being the correct one for easy draught, are there any limitations in the practice of it? A. There must be, even with the horizontal trace. With a horse 16 hands high, the point of attachment of the trace to the hames could scarcely be brought nearer to the ground than 44 inches, and with a horizontal trace this would involve a fore-wheel of seven feet four inches in diameter. As the highest wheel used for field-guns is only five feet in diameter, it will be seen that it is quite impossible to carry out the principle.

3002. Q. Admitting that the horizontal trace is the most favorable for traction on a perfectly level and smooth surface, how is the draught affected on an inclined plane? A. When the carriage leaves the level and gets on an inclined plane, the horizontal trace becomes parallel to the road, and is no longer at right angles with the perpendicular passing through the nave of the wheel, therefore greater power must be applied.

3003. Q. What is the lever-power of any two wheels in overcoming obstacles proportionate to? A. To the height or diameter of the wheels.

3004. Q. Why are the fore-wheels of vehicles as a rule made of considerably less diameter than the hind ones? A. For the convenience of turning, the room required being thereby considerably lessened.

3005. Q. Why is it a mistake to throw the heaviest part of a load on the fore wheels of a vehicle? A. In the first place, being smaller, they are weaker; in the second place, whatever their relative height may be, the fore wheels have always heavier work to do than the hind wheels, for whom they crush obstacles and open smooth tracks—planing the way, as it were, for them.

3006. Q. Why is the same height applied to the fore wheel in artillery carriages as to the hind wheel? A. In order to support the greater weight of the limber, when filled with ammunition and carrying two or three men, than the weight of the gun itself, as well as to obtain the leverage in overcoming obstacles which a large wheel possesses over a small one.

## TRAINING FOR DRAUGHT.

3007. Q. What is the greatest and most frequent mistake made in training for draught? A. It is the undertaking of too much at a time with young horses.

3008. Q. What is the result generally of undertaking too much at

a time in training for draught? A. While some horses may submit patiently, many others will resist, become frightened or infuriated, and smash everything, and in the end spoiled for draught forever.

3009. Q. In what manner should one begin to train a horse for draught? A. It is much better, and in the end shorter, to begin by putting some portions of the harness on the horse in the stable, working up to the whole set by degrees.

3010. Q. What is next to be done after putting all the harness on in the stable? A. Take the horse out and walk him quietly about, taking care that the traces do not dangle. Then the traces may be taken down, lengthened a yard or two by a piece of rope, and held by an assistant in rear whilst the trainer takes the reins.

3011. Q. What should be done with a young horse prior to training him for draught? A. A perfectly raw horse should first of all be lounged and trained to a certain extent under the saddle. The more carefully and completely this has been done the less trouble there will be afterwards.

3012. Q. In training young horses for draught what two things does he come in contact with first, and what is the consequent action of the horse? A. First of all the collar, and then the bridle, or more properly the bit. At first starting young horses usually make a violent effort, plunging, as it were, into the collar and then recoiling again to make a new plunge and a new recoil, which sometimes ends in their throwing themselves down or perhaps running away.

3013. Q. What is it that the horse recoils from in this sudden plunge? A. He recoils from the sudden pain inflicted on the neck and shoulders, and perhaps from a sharp bit he has in his mouth.

3014. Q. Why is it that mules and oxen work better than horses for heavily loaded vehicles? A. Heavy and slow draught animals acquire the habit of throwing their weight gradually into the collar, thus bringing the vehicle by slow degrees into motion, for it is a well-known fact that it requires twice or even thrice the effort which suffices to keep a loaded vehicle in motion to start it. When horses (except large, well-trained draught-horses) are required to start a wagon, omnibus, tram-car, or other tolerably heavy vehicle quickly, they almost always effect this by making a sort of plunge into the collar, and a large proportion of the effort thus made is expended on straining the harness and carriage, and inflicting unnecessary pain on themselves.

3015. Q. Is there anything known whereby this plunging into the collar may be remedied? A. Yes; Fehrman's "horse-saver," which consists of a hollow cylinder of iron about 12 inches long, closed at one end by a permanently-fixed bottom, through the middle of which a hole is bored sufficiently large to admit the free passage of a  $\frac{3}{8}$ -inch to  $\frac{1}{2}$ -inch thick iron rod; the other end of the cylinder has a movable bottom, and is fitted with a loop or

ring. The interior of the cylinder contains rings of India rubber, such as are used for gas and steam checks, and thin metal disks perforated in the centre with a  $\frac{3}{8}$ -inch to  $\frac{1}{2}$ -inch opening placed alternately, a ring coming next to the fixed bottom of the cylinder and a disk at the other end of the column of rings. The iron rod has one of its ends shaped like a draught-hook; the rod passes through the hole in the fixed bottom of the cylinder, leaving the hook projecting, and up through the centres of the rings and metal disks, resting on the topmost of these by means of a key; the whole is completed when the movable bottom is fixed into the cylinder.

3016. Q. In what way does Fehrman's "horse-saver" work? A. If a pair of them be attached by their rings to the draught-hooks of a vehicle, and by their hooks to the trace of a harnessed horse, the animal will exert its strength against the elastic column of rings and disks inside the cylinder, instead of immediately against the rigid frame of the vehicle. Overcoming the resistance easily at first, it does not have recourse to a violent plunge into the collar, and by the time the iron rod has begun to compress the rubber rings into a state of rigidity, the vehicle, if not loaded out of proportion to the number of horses attached, will have begun to move.

3017. Q. In training horses for draught, what advantage is derived from a horse discovering that an immediate result follows its first effort? A. Practice has proved that the animal seems to be encouraged thereby to exert its strength.

3018. Q. What appliance to a wagon diminishes the amount of traction required? A. The use of springs very considerably diminishes it (although the weight of the vehicle is increased thereby), for the reason that the checks to the collar, arising from the inequalities of the ground, are greatly diminished.

3019. Q. Although in training horses for draught it is not advisable to use a very light bit, and a heavy one being very painful, how may the matter be remedied? A. By using a training-halter and the running-reins combined, a common snaffle can be put into the young horse's mouth without incurring the least risk of his running away, as the halter prevents the animal opening his jaws and getting the snaffle on to his tongue, whilst the running-reins afford a perfect command over the head.

3020. Q. What should the driver do when using the training-halter and running-reins at the first start of the animal? A. When the young horse makes his first plunge into the collar, the driver should give him his head, and the probability is that there will be no recoil, or at least that it will then be quite clear where the difficulty lies, and therefore the remedy easier to find.

3021. Q. What is it advisable to do in biting horses for draught for the first time? A. They should be bitted so that they may take a firm leaning on the hand at first, and then by degrees the

bitting may be altered to suit all the circumstances, both of the animal and the driver.

3022. Q. What mistake is sometimes made in putting an untrained horse to a vehicle? A. It is in some narrow court or yard which necessitates, perhaps, a sharp turning immediately after starting. This should be avoided, and the start made if possible on a straight line and on a quiet road, and early morning is the best time for this work.

3023. Q. What two parts of a harness may, if carelessly or awkwardly used, prove serious obstacles to the training of a young horse? A. One of these is the crupper, the other the bearing-rein. This latter should be laid aside altogether with a young horse at the first trial; if judiciously used subsequently, it may be of good service in getting the horse's head into the proper position, and making it light in the hand by dividing the pressure over two mouth-pieces instead of one; and this is its legitimate use.

3024. Q. What class of horses require most caution in the use of the bearing-rein? A. Short-necked horses with ill-set-on heads; these are the animals that people are naturally tempted to try it on.

3025. Q. Of what use is the bearing-rein on a horse? A. If a tolerably fresh horse be turned loose in a field, especially one in which other strange horses are present, it will be seen, in most instances, after a few cautious movements, with the neck erect and its weight thrown well back on its haunches, in the attitude of preparation for any emergency, suddenly to bolt off, with the head and neck brought down more and more as it extends itself and increases its pace, whilst reconnoitring the ground and its new companions in a wide circle round them. And this is precisely what a frightened horse will do in harness unless checked by the bearing-rein, which, if of proper length, will prevent the animal from laying itself out with extended head and neck and throwing all its weight on the fore legs, which, of course, leaves the hind pair their maximum power of propulsion.

3026. Q. Why is the crupper still more dangerous than the bearing-rein? A. Because it is by far the most usual primary incitement to kicking in horses.

3027. Q. What is one of the most obvious of uses for the crupper? A. It is that it affords a sort of counter-check for the bearing-rein.

3028. Q. As there is really no good reason why the harness-saddle or terret-pad should not be so constructed as to keep its place sufficiently well as to afford a counter-check for the bearing-rein, what conclusion is arrived at by well-known horsemen on the subject of the crupper? A. That, although a great number of horses willingly endure the crupper, a great many others, especially mares and young animals, will not do so, and with

them it becomes an incitement to vice of one kind or the other; and finally, that it may very well be dispensed with in all cases.

3029. Q. In placing a brake upon a vehicle, how should the power be applied? A. As nearly in the centre of the brake-bar as possible, and this should act on the tire of the wheel on a level with the axle-tree. If the power, as is sometimes the case, be made to act not in the centre of the brake-bar, but at or near one end of it, the consequence is that the other end, not being equally braced up, jerks and makes a clapping noise, not only occasioning loss of power, but apt to frighten the horse.

### RESTIVENESS.

#### HOW TO RENDER HORSES OBEDIENT.

3030. Q. Are the terms restiveness and viciousness synonymous? A. No. Simple restiveness or disobedience should not be confounded with the peculiar temperament or disposition which constitutes a really vicious horse.

3031. Q. Can a vicious animal's temper be changed? A. Scarcely, although it may be dominated by force. The over-awed and subdued brute is not thereby rendered a useful and docile servant.

3032. Q. What is the danger in attempting to overcome special forms of restiveness or insubordination? A. The natural tendency is to induce riders to rely on forcible measures in all cases, the result of which is but too frequently to convert a simply restive horse into a decidedly vicious one.

3033. Q. What should never be forgotten in attempting to overcome a horse by force? A. That in the end the horse is stronger than the man; that there is very great danger of this becoming quite clear to the former, when mere force comes to be opposed to force; and that this very consciousness is what constitutes restiveness, and if exasperated by cruel treatment, becomes *vice*, pure and simple.

3034. Q. Before the stigma of vice is affixed to a horse, what should be considered? A. What the poor thing might with fairness retort, and the words ignorance, timidity, or brutality will immediately suggest themselves; want of judgment as to what a horse can fairly do, want of decision and promptitude in demanding this, or unnecessary violence in enforcing a demand, especially an unreasonable one, are almost always the first causes of restiveness.

3035. Q. What does the intelligence of the horse enable it to soon find out? A. Whether its rider be or be not deficient in that self-same quality—courage; the consciousness of superior strength encourages it to set the rider at defiance and it turns restive.

3036. Q. What special thing is to be considered with regard to

the horse's character? A. That it loves to exercise its powers, and it possesses a great spirit of emulation; it likes variety of scene and amusement, and will work willingly to the last gasp under a rider that understands how to indulge it in all this without overtaxing its powers.

3037. Q. How are the evils of having horses refuse to go any but a certain way, or to leave their stables, or cling to other horses they meet with, produced? A. Deficiency of exercise and riding the same dull round, either alone or in company with other horses. Horses, like men, don't like to be bored, and would rather stick at home; they like amusement, variety, and society; give them their share of these, and avoid getting into a groove of any kind, either as to time or place.

3038. Q. What is the peculiar method of treating restiveness by the English and Continental systems? A. The English plan is merely gradually habituating the horse to go in the manner desired, and leaving it very much to its own will and pleasure to do so. The Continental mode consists in endeavoring to obtain, by more stringent and systematic means, a perfect mastery over its movements, aiming at complete mastery over the propelling power—that is, the horse's hind legs.

3039. Q. What does the Continental system tend to call forth? A. If hurried or injudiciously employed, it will call forth the spirit of resistance and insubordination in a horse, for it is precisely this control over their hind legs that horses dislike, and seek to escape from with the greatest pertinacity and cunning.

#### GENERAL RULES FOR THE TREATMENT OF RESTIVENESS.

3040. Q. What is the first and most important rule to be observed in the treatment of restiveness? A. To ascertain the cause of the restiveness, and the circumstances under which it was first displayed and is usually repeated.

3041. Q. Where are the principal causes of restiveness to be sought? A. Either in some physical defect of conformation, in the condition of the animal, in its disposition, or in its temper, and sometimes in a combination of two or more of these.

3042. Q. What frequently leads young horses into insubordination? A. Defects of conformation, such as weak backs, hind quarters, or something abnormal about the head and neck.

3043. Q. How does starvation act as a cure for restiveness? A. In most instances it is positively injurious. A horse's temper may be subdued to a certain extent, but then the animal becomes unfit to do work.

3044. Q. What is the second general rule for the treatment of restiveness? A. Avoid giving the horse an opportunity of resisting your will successfully, so long as it possesses the means of

doing so—that is to say, until one has acquired complete control over its movements.

3045. Q. What is a safe method to adopt to secure control over a restive horse? A. Have your horse led into a riding-school, or some enclosed space where it has never shown restiveness, and do the work there; and after each lesson dismount again, loosening girth, etc., also caressing the animal if obedient, and avoiding to push it prematurely to the verge of resistance, trusting rather to gradual progress than to violent measures. All horses are very susceptible to and grateful for kindness.

3046. Q. How should horses be treated who refuse to leave their stables, either from natural sluggishness or indisposition to leave their companions? A. Lead the animal away to some distance, taking along a nose-bag of oats, of which give a handful now and then. You may after a time mount the horse, and when on its back give it a handful of oats from the saddle before attempting to go further, getting its head, of course, in the proper direction. If this does not succeed at first, dismount again rather than risk a conflict, lead the animal out a couple of miles, and give it the whole contents of the nose-bag at some convenient place, taking each day a different road, and *never feeding twice in the same place*. You can *always* ride home, and this will be the opportunity for acquiring control over its neck, head, and hind legs. The more it hurries back to its stable, the better one will be able to do this work, dismounting at some little distance and leading the horse home, never repeating the operation in exactly the same place.

3047. Q. How should a horse be treated who has an attachment to stable companions? A. Put a rider on one of these, whose business it will be to sometimes keep ahead and then alongside your own horse, or again in rear, making circuits, riding away, and returning. The nose-bag with oats may also be added to this method of treatment. Thus the animal may be got and kept under way constantly, which gives the rider the desired opportunity of working it.

3048. Q. What, therefore, is the main object of the preliminary treatment for restiveness of the above-mentioned forms? A. To get the horse to go *somehow* in the first instance, and then by degrees in obedience.

3049. Q. What should be done if the restiveness be traceable to physical defects? A. The seat must be adjusted very carefully, and sometimes even change the saddle with that view. Never rest the whole weight on the horse's loins by placing yourself at one end of a long saddle, and tuck up the legs with short stirrups at the other end. On the contrary, one must get well down into the centre of the saddle, with somewhat of a fork seat, and the bringing of the weight forward must be accomplished, not by bending in that direction from the hips, which will lose

you all control over the horse's neck and head, but by bringing the seat itself into the proper place.

3050. Q. As it is impossible to lay down any cut-and-dried rule for the treatment of restiveness in each individual horse, what is it almost always advisable to have recourse to, and why? A. To the lounge; if for no other reason, because it affords the best opportunity of seeing and studying the horse's action, and ascertaining exactly the means by which it resists.

3051. Q. When using the lounge, at what period should a rider be placed on the horse's back? A. When the horse is inclined to trot out well and freely on the lounge, and then to alternate the lounging and riding lessons as may seem advisable, until the former become unnecessary.

3052. Q. What is the general plan for treating restiveness? A. First, lounging with loose reins; second, lounging with reins gradually shortened until the hind-legs are brought under subjection, the horse still going free; third, riding with loose reins; fourth, riding with shortened ones, varied with bending lessons—at first whilst standing still, then in motion; fifth, and finally, occasional rides out, giving up the school by degrees, until at length it may be dispensed with altogether. Patience, determined, cool courage, intelligence, kind treatment, and perseverance are the main requisites; there is no royal road—the thing can only be done by fair work.

3053. Q. What position will restive horses generally assume at the moment they defend themselves? A. In almost all cases they gather their legs under the body, sinking their croup, which may be seen from the position of the tail, getting the head and neck well down, and putting up the back like an angry cat.

3054. Q. What is the main thing to be done in overcoming the position thus assumed? A. The main thing to do is to get the horse to stretch himself by trying to get the head up a little; if opposition be met with, give way, as if you did not perceive it, and try again. In proportion as you get the head and neck up gently, the back will flatten down and the horse will move one or both hind legs backward or one or both fore legs forward; by degrees the horse will be got to stretch himself.

3055. Q. When a horse has learned to stretch himself willingly, what will the next object be? A. To get it to move in obedience. If it refuses to go forward, by edging over its head and neck in the proper position, it will step sidewise, to save itself from falling; reward the horse by loosing the straps, and leave it to the groom to lead about for exercise and then home. In a day or two it will follow your hand forwards for the sake of the oats you show it; then by degrees it will learn to circle with the croup round the fore hand; you will "unfix" the feet and flatten the back by degrees, taking care to stop each movement and limit its extent with the cavesson; real obedience is thereby established,



and the horse will soon follow you in a wide circle, when, the assistant taking your place at its head, you at length arrive at lounching.

3056. Q. On the whole, what is the key to mastering the horse's powers and utilizing them fairly, whether merely for handling young ones, or for the prevention and cure of restiveness? A. It is to be found only in a thorough knowledge of the mechanism of that animal's movements.

3057. Q. Where is the central point of resistance in a horse that coils himself up, as it were, and how is the rider to be governed with regard to his seat? A. It is the fourteenth vertebra, and the nearer the rider's seat is to that point or centre of motion the less will it be liable to disturbance from the violent efforts that ensue. If he sits further back towards the loins, his weight being there will interfere with the management of a rearer or backer and expose him directly to the action of a kicker; if, on the contrary, he sits close to the horse's withers, he unduly overweights the fore hand, and loses most of his control over the hind legs.

3058. Q. What should be the position of the rider's body from the hips up, and why? A. The getting up of the horse's head and neck to the required position demands a certain amount of fixity of the spinal column, for the work to be done by the arms brings into play the muscles of the entire back. The rider that comes into antagonism with his horse is only then safe in his seat when his own centres of gravity and motion fall in the same perpendicular line with the horse's centre of motion; otherwise he will have to contend with the centrifugal motion by dint of muscular exertion alone.

### SPECIAL FORMS OF RESTIVENESS.

#### BOLTING.

3059. Q. What is the first step to be taken in the treatment of a bolting horse? A. To ascertain why the horse bolts.

3060. Q. What are some of the causes of bolting in horses? A. A nervous and excitable temperament, physical defect, or peculiarity of conformation; it is frequently rather an effort of despair than anything else, and an evidence that something has been demanded of the animal beyond its strength.

3061. Q. What kind of horses endeavor to escape pain, in injudicious attempts to force them, by running away? A. Horses with short necks, narrow jaws, and ill-set-on heads; or, again, with long, unstable necks.

3062. Q. What is the first impulse of a great many riders whose animals bolt? A. To put a sharper bit into their mouths, or at least to shorten the curb, and perhaps rig the horse out with some sort of a martingale that gives them a good hold of the

head, to secure which more effectually they plant their feet firmly in the stirrups, probably at the same time throwing their own weight as far back as possible towards the horse's loins.

3063. Q. What is the best and only remedy for a bolter? A. A very carefully fitted and well-adjusted bit, a perfectly painless curb, a light hand, and last, but not least, a very firm, steady seat, somewhat forward with horses that have weak hind quarters.

3064. Q. Why is it a good plan to put a bolter on the lounge? A. For the purpose of studying carefully its action, and finding out by degrees in what position or trim it will go steadily and quietly in different places.

#### BUCKING OR PLUNGING.

3065. Q. What is the position a horse assumes when bucking? A. In bucking, the horse gather its legs under its body, puts up its back and its head down, and then commences a series of see-saw movements, throwing itself from the hind to the fore legs in rapid succession, either without moving forwards, or in a succession of bounds, which latter is called plunging.

3066. Q. In what kind of horses does bucking usually occur? A. With young horses, especially the steppe horses of Russia or the plains horses of America.

3067. Q. What is the best method of handling bucking horses? A. On the lounge with the dumb-jockey, the great object being to get them to move forwards and prevent the head from coming down. As the bucking or plunging usually commences when the horse is put into a trot, it should be kept as long as possible at a walk on the circle, which is best effected by letting a man go alongside its head, holding the bridle if necessary. The reins should not be buckled tight, as forcing a bucker will often make it throw itself down, or rear up and fall back. If it does begin to buck, let it tire itself out, and when it is well wearied, one or two smart blows of the whip applied under its chest will make it go ahead. Thus by degrees it will give up the habit.

3068. Q. If a horse takes to bucking or plunging under the rider how should it be managed? A. The object should be to make it go ahead by a few smart strokes of the whip on its shoulders, even at the risk of its running away. This will give the rider an opportunity of getting the head up by first bending the neck to one side.

#### REARING.

3069. Q. What is rearing in horses the evidence of? A. It is the evidence of injudicious management of some kind—either from untrained horses being brought into positions for which they are as yet unfitted; or from something being demanded of

them that was beyond their power ; or from the rider not knowing how to recognize and subdue the very first symptoms of disobedience ; or, finally, from his using violent and intemperate methods of doing so. It is the most dreaded form of vice that occurs, and therefore the dodge that cunning horses resort to most frequently.

3070. Q. What position does a horse assume before it actually does rear up ? A. Its head or mouth has shrunk away from the feeling on the mouth-piece, and it has got its legs under its body, and is come to a dead standstill. After slinking away from the rider's hand and seat, so that he loses all hold of it, the animal suddenly stiffens its hocks, throwing its whole weight on them, and at the same moment stiffens also its neck, and especially the throat, so that it becomes quite impossible to get a downward pull at it.

3071. Q. What is the safest way of managing confirmed rearers ? A. On the lounge, without the dumb-jockey, which would very likely injure the horse severely in case of its throwing itself back. The general plan of treatment will consist in getting the animal to bend its hocks and neck ; bending lessons, when halted or at a walk, must be persevered in first.

3072. Q. If a rearing horse is on the lounge and suddenly stops and rears up, what should the trainer do ? A. He should shorten the line in coils in his left hand, holding it firmly in the right, just long enough to keep him clear of the horse's fore legs, and placing himself exactly opposite to the animal's head, so that by stepping back a pace or two he is sure to retain a good feeling on the line when its fore legs again touch the ground, while an assistant with a whip steps meanwhile smartly up behind the animal. The trainer should not attempt to pull the horse's head downwards forcibly, or to jerk at the lounge, simply keeping a good feeling on the line. He must wait patiently, watching the horse's movements, taking care always to preserve his own position, so as to be ready when the moment for action arrives. But the assistant with the whip should meanwhile deliver a few heavy, deliberately-aimed blows on the animal's buttocks—taking care to hit one and the same spot repeatedly, watching anxiously for the moment when the rearer shows signs of getting tired, of standing on its hind legs, and is about to go down. This is the moment at which the last and most effective cut of the whip should be inflicted ; and this the moment for the trainer to give a short sharp drag on the lounge downwards.

3073. Q. What should be done if a horse makes a sudden plunge forward, when it has consented to bring its fore-legs to the ground under the influence of the whip ? The trainer must then step smartly to one side—the off one if possible ; and catch the horse cannily in mid-air with the lounge, handling it quickly and neatly, and taking especial care not to stumble into the slack

coils in his left hand. This manœuvre, if well carried out, will afford complete mastery.

3074. Q. What should be done by a rider when a horse rears that has never shown any previous symptoms of restiveness? A. It requires presence of mind and great coolness; also, a really firm seat, wholly independent of the stirrups on the one hand and the reins on the other. The very fact of the horse ever getting to the length of rearing is presumptive evidence of the rider's legs being in the wrong place at the time. But if a man sits to his saddle by his thighs, and has his own body in balance, he will never pull the horse over backwards. If he then has presence of mind sufficient to preserve a feeling with the reins, there will be a moment when the animal's backbone will have assumed an angle not greater than 45 degrees. This is the moment to screw both spurs as forcibly as possible into the horse's sides, the effect of which is to bend the hocks if the hand be held counter; the animal will, in nine cases out of ten, make a plunge forward, and having preserved throughout a proper degree of feeling with the reins, the rider will be enabled to catch the horse in the air and bring it to the ground, so that the hind leg should touch this a moment sooner than the fore ones, or at least so that they should get the greater part of the shock.

#### KICKING.

3075. Q. When the vice of kicking proceeds from natural causes, what help is there for it? A. There is no help but to employ the horse in whichever way it is content to do its work quietly.

3076. Q. What should be done with young horses that simply take to kicking during the handling? A. If the trainer has made some mistake, or been in too great a hurry, or put the saddle too far back, or girthed the animal too suddenly or too tightly, watch for the exciting cause, and when this is removed the vice will disappear.

3077. Q. What should be done with those young horses that take to kicking simply because they do not choose to go? A. These should be put on the lounge with the dumb-jockey, which will prevent their getting their heads down. If the horse stops on the circle and begins to kick, the trainer should proceed precisely in the same manner as with the rearer, the assistant, however, waiting until the horse has extended its hind legs to their utmost stretch. This is the moment to apply a good stroke of the whip just under the animal's belly, taking care never to hit the hind legs, nor to strike at all except at the moment they are fully extended. A few well-delivered strokes will generally make the kicker only too anxious to get away from the whip and go ahead quietly.

3078. Q. What should be done if a horse, after ceasing to kick, refuses to move forward? A. The trainer must then proceed to unfix his feet, or make them rein back gradually.

3079. Q. What should be done if a horse, after ceasing to kick, takes to running backwards? A. All one can do is to follow them quietly, merely keeping their heads straight, so that they should not run up against a wall or the like, taking care not to press so heavily on the lounge as to throw the animal's weight on the fore legs, as this will offer it the opportunity to resume the kicking. When the horse gets tired of backing he will stop of his own accord, and this is the moment for the assistant to give a dexterous stroke under the belly.



## PART IX.

### *FIRE DISCIPLINE.*

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TEXT-BOOK: *Batchelor's "Infantry Fire."*

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FOR ALL OFFICERS OF INFANTRY—Nos. 3080-3247.





## PART IX.

### *FIRE DISCIPLINE.*

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#### THE TRAJECTORY.

3080. Q. What would be the effect on the bullet of the projectile force acting alone? A. To drive it straight ahead forever at a uniform rate.

3081. Q. What prevents the bullet going straight ahead? A. Gravity.

3082. Q. How does gravity affect the path of the bullet? A. It bends it downward.

3083. Q. What prevents a uniform rate of flight of the bullet? A. The resistance of the air, which makes the rate slower and slower.

3084. Q. What is the technical name given to the curved path of the bullet? A. Trajectory.

3085. Q. Define "time of flight" for any point of the trajectory. A. It is the time required for the bullet to go from the origin of fire to the point in question.

3086. Q. What effect on time of flight has a change in curvature of trajectory? A. Curvature and time of flight increase and decrease together.

3087. Q. Why should curvature of trajectory and time of flight increase and decrease together? A. Because the greater the curvature the higher goes the bullet and the longer it takes for it to fall to any given point.

3088. Q. What is meant by the term "ordinate"? A. It refers to the points of the trajectory, and means the distance of a point above the line of sight measured vertically.

3089. Q. What term is used to specially designate the longest ordinate of a trajectory? A. "Greatest height."

3090. Q. What ratio measures the "flatness of the trajectory"? A. The ratio between the range and greatest height.

3091. Q. Define "first catch." A. It is the first point at which the descent of the bullet brings it within the height of the object.

3092. Q. Define "first graze." A. It is the point at which the bullet, if unobstructed, would meet the ground.

3093. Q. Define "dangerous zone." A. It is the space in which the object may be struck.

3094. Q. Where does the dangerous zone begin and end? A. It begins at "first catch," where the bullet first comes within the height of the object in its descent, and ends at "first graze," where the bullet, if unobstructed, would meet the ground.

3095. Q. What is meant by the "angle of fall" of a bullet? A. It is the angle with the ground made by the tangent to the trajectory where it meets the ground. In the case of an arrow the shaft would represent the tangent.

3096. Q. How would the extent of the dangerous zone be affected by a change in the angle of fall? A. Increase produces decrease, and *vice versa*.

3097. Q. Besides long range and penetration, which all rifles now possess in a sufficient degree, what remaining qualities are mentioned as important? A. Flatness of trajectory, accuracy and rapidity of fire.

3098. Q. Which is the more important quality of a rifle—that which secures flatness of trajectory, or its accuracy, and why? A. That which secures flatness of trajectory, because greater flatness of trajectory improves all firing, while a rifle's accuracy can be utilized by good shots only.

#### VARIATIONS IN THE TRAJECTORY.

3099. Q. What is the difference between individual fire and collective fire as regards choice of object, elevation, and consumption of ammunition? A. In individual fire these are in the discretion of the firer, and in collective fire they are directed by leaders; the first is uncontrolled, the second is controlled.

3100. Q. Is this regulated collective fire necessarily simultaneous? A. No; it may or may not be.

3101. Q. Define "shot group." A. A surface over which bullets spread when the rifle is aimed for a number of shots exactly at the same point with the same elevation.

3102. Q. What effect upon the shot group has increase of range? A. Increase of dimensions.

3103. Q. What three classes of causes are assigned for this spread of bullets? A. 1. Those due to rifle and ammunition. 2. Those due to the firer. 3. Those due to external conditions.

3104. Q. How may these causes be classed with reference to constancy and variability of effects in spreading bullets? A. Those due to rifle and ammunition will produce a nearly constant dispersion. The others are variable.

3105. Q. What are the variable imperfections of the rifle? A. Fouling, heating, and rust.

3106. Q. What are the only suitable objectives at long ranges?  
A. Bodies of troops in close order.
3107. Q. What effect has an inclination of the rear sight?  
A. It causes the bullet to fall short if the inclination is forward, and to the side of the inclination also if otherwise.
3108. Q. What effect upon the importance of accuracy in adjusting the rear sight for elevation has increase of range?  
A. The effect of increasing it.
3109. Q. What sight, fine or full, is best for battle use?  
A. Full sight.
3110. Q. What is the easiest way to determine the range on the battle field? A. Ask the artillery.
3111. Q. What other ways are there? A. Range-finders, and, as a last resort, the eye.
3112. Q. Elevation being the same, how is the bullet affected with reference to a hot or cold day, dry or damp, fair or during rain or snow, in high or low altitudes? A. It goes farther on a hot day, farther on a damp day, farther on a fair day, and farther in high altitudes.
3113. Q. On a dry day or on a damp day? A. On a damp day.
3114. Q. On a fair day or during rain or snow? A. On a fair day.
3115. Q. In high altitudes or low ones? A. In high altitudes.
3116. Q. What cause of error in aiming should always be guarded against in fine weather? A. Side-illumination of sights.
3117. Q. What is the effect upon the position of a hit of fixing the bayonet? A. Fixing bayonet lowers the hit and throws it to that side upon which it is attached to the barrel.
3118. Q. The elevation being the same, will the bullet go farther in a head wind or a rear wind? A. Rear wind.
3119. Q. In adjusting sight for cross wind, are points taken towards the wind or away from it? A. Towards the wind.
3120. Q. Define "accuracy of the rifle." A. The greater or less probability it gives of striking a given object.
3121. Q. What measures the accuracy of the rifle? A. The dispersion of shots due to the rifle alone.
3122. Q. Upon what does accuracy of the rifle depend? A. Perfection of manufacture.
3123. Q. "Accuracy of fire" is how measured? A. By the dispersion of shots in the group, considering all the causes of deviation.
3124. Q. "Correctness of fire" is how measured? A. By the approximation of the centre of the shot group to the point of aim.
3125. Q. What are the two factors of value of fire? A. Accuracy of fire and correctness of fire.
3126. Q. In discussing the efficacy of fire, what imperfections only is it possible to consider,—those which effect nearly constant dispersions of shots within a determinable area, or may there be

included also those which effect a variable dispersion over an area whose dimensions are not determinable? A. Only those which effect a nearly constant dispersion within a determinable area.

3127. Q. What causes are these? A. Those due to rifle and ammunition.

#### MEAN AND PRACTICAL TRAJECTORY.

3128. Q. What is the shape of the bundle of trajectories described by many bullets shot from the same rifle under the same conditions? A. It is the shape of a curved cone, analogous to a jet of water from a hose.

3129. Q. What is the "mean trajectory"? A. It is an imaginary curve which occupies a mean position among all the trajectories of the cone. The axis of the cone.

3130. Q. For what purpose is the mean trajectory of value? A. It is the trajectory to which calculations are usually referred, and gives the mean height of the bullets above the line of sight at any point of their flight.

3131. Q. In calculating the chances of hitting an object, how much of the cone should be considered on the mean trajectory? A. The whole cone.

3132. Q. What is the whole cone of trajectories called in consequence of the necessity of taking all its trajectories into account in calculating the chances of hitting an object? A. It is called the "practical trajectory."

3133. Q. Define "shot-group." A. For any range it is the surface covered on a vertical target by all the shots fired at that range.

3134. Q. Describe the distribution of hits in the shot-group. A. The hits are denser around a mean point which marks the mean trajectory. As the number of hits increases, the form of the shot-group, omitting a few abnormal hits, constantly approaches that of an ellipse with the greater axis vertical.

3135. Q. What is the "point" and what the "centre of impact"? A. The point where any shots strikes the target is its "point of impact;" and the "centre of impact" is a point having a mean position in a group of shots, and is the point where the mean trajectory would strike the target.

3136. Q. What is meant by "horizontal" and "vertical deviation" of any hit? A. Its horizontal and vertical distances from the "centre of impact."

3137. Q. What is meant by "mean absolute deviation," and of what is it the measure? A. It means the average distance of shots from the "centre of impact." It measures the accuracy of a rifle, and gives a standard by which different rifles may be compared.

3138. Q. How is the mean absolute deviation of the shots

obtained? A. First find the mean horizontal and vertical deviations; these will measure the accuracy of the rifle in those directions. Extract the square root of the sum of the squares of these two mean deviations, and the result will be the mean absolute deviation, and measures the accuracy of the rifle.

3139. Q. For practical purposes, what portion of the cone of trajectories may represent the whole cone, and why? A. The vertical section showing the mean and extreme trajectories; because vertical errors in shooting are so much greater than horizontal errors.

3140. Q. How is the cone of trajectories expressed; that is, what data fix its dimensions? A. It is expressed by stating the ordinates of its mean and extreme trajectories.

3141. Q. Would a firer kneeling be liable to change the point of impact of his hits by changing his position to standing? and if so or if not, why? A. No, because of the very small angle between the lines of sight.

3142. Q. Would a firer standing get a deeper dangerous zone by changing his position to kneeling? A. Yes. A German experimenter says that at a range of 400 metres a gain of 50 metres was thus obtained.

3143. Q. What is the practical dangerous zone? A. It is that which is traversed by the whole cone of trajectories.

3144. Q. What portion of the object is the proper point of aim? A. The foot.

3145. Q. Name some of the advantages to be derived from aiming at the foot of the object. A. It gives a wider latitude of vertical error. It increases number of hits and depth of dangerous zone. Ricochets from the lower half of the cone are effective. The foot is least liable to be obscured by smoke. The ground is better covered, since there is less space in which the bullet rises above the height of the object. Slight errors of elevation are less liable to cause misses. A slight upward movement of the barrel would be less liable to cause the object to be obscured by the front sight.

#### LIMIT OF INDIVIDUAL FIRE.

3146. Q. What is the "limit of profitable individual fire"? A. It is the limit beyond which the results to be expected will not compensate for the expenditure of ammunition.

3147. Q. Name the four cases in which the limit of profitable individual fire is reached. A. 1. When the shot-group equals the objective in either dimension; 2. When the practical dangerous zone disappears; 3. When the probable error in estimating the distance becomes equal to the depth of the practical dangerous zone; 4. At the range where the bullet begins to rise above the head of a standing man at any point of its flight.



3148. Q. In the case of opposing lines of battle, what is the limit of profitable individual fire for the Springfield rifle, and what fact establishes this limit? A. The limit is 400 yards; and is established by the fact that up to this range the bullets remain within the height of a standing man's head during their entire flight, the aim being taken at the feet. It is also established by the fact that beyond this range a slight error in guessing, or estimating the range with an instrument even, will cause the whole cone of trajectories to fall short of, or go entirely over, the dangerous zone of the exact range.

3149. Q. When the range is exactly known, under what conditions may long-range individual fire be profitably employed? A. When there is plenty of ammunition, and the soldier may fire with a rest behind cover, as in siege operations.

3150. Q. What is the long-range limit of profitable individual fire with the Springfield rifle, and why? A. 800 yards; because at that range the practical dangerous zone disappears.

3151. Q. Illustrate the disappearance of the practical dangerous zone. A. The practical dangerous zones are rectangular spaces in the plane of the upper and lower trajectories, having for uniform height that of the object. The verticals dropped from those points of the upper trajectories at the height of the object are the front edges of these rectangles, and the verticals erected at those points in rear where the lower trajectories meet the ground are the rear edges, front and rear having reference to the enemy facing the firer. With increasing range, and consequent increasing angle of fall, these edges approach each other until a range is reached at which the lower trajectory pierces the ground at the foot of the front edge. The edges thus coinciding, the space between them becomes zero and the zone disappears.

3152. Q. What considerations touching ammunition-supply and the physical endurance of the firer rigorously demand that individual fire be confined within the profitable limit? A. The supply of ammunition is very difficult to replenish, and the exhaustion of the ammunition-supply before the fight is won means defeat. Experience in war shows that it takes hundreds of cartridges to disable one man. The wear and tear on the muscles and nerves of the firer from much firing are so great that fire should be reserved as long as possible.

3153. Q. Can any approximation to the high percentages made on the target range be reasonably expected in war, considering the experience of recent wars? A. No.

#### COLLECTIVE FIRE AND COMBINED SIGHTS.

3154. Q. What is "collective fire," and at what range does it properly replace individual fire? A. It is controlled fire—that is, fire which is under such direction that the bullets are concen-

trated on chosen objectives. It takes the place of individual fire beyond 400 yards.

3155. Q. What are collective groups, and on what surface are they noted for study? A. When a body of men fire on the same object with the same elevation there results a cone of trajectories; the groups made by the intersection of this cone with any target may be called collective groups. For study it is usual to note these groupings on the surface of the ground.

3156. Q. What is the law of distribution of hits in collective groups? A. The hits are distributed in groups having the form of an ellipse whose greater axis is in the direction of fire. They are more densely grouped towards the centre.

3157. Q. What is the length of the beaten zone at short and long range for the best 90 per cent of the hits in a collective group; and what the length for the best 50 per cent? A. For the best 90 per cent the average depth of the beaten zone is 300 yards for the shorter and 200 yards for the longer ranges up to 1400 yards. For the best 50 per cent the corresponding depths are 150 and 100 yards.

3158. Q. Name and describe the parts into which the beaten zone is divided by differences of density of hits, and define "centre of impact" as applied to collective groups. A. The zone containing the best 50 per cent of the hits is called the "nucleus;" that containing the next best 40 per cent is called the "envelope;" and the rest of the beaten zone is called the "tailings." The middle line of the nucleus, parallel to the front of the firing-line, is the "centre of impact."

3159. Q. What is the depth of the nucleus from 500 to 1400 yards with trained and chosen firers? A. One hundred yards.

3160. Q. In view of the monopoly enjoyed by "individual-fire" training in our service heretofore, and also of the fact that individual fire can be utilized only within 400 yards, what kind of instruction should now be imparted as of equal importance? A. Instruction in collective fire.

3161. Q. Between 500 and 1000 yards what correspondence is there between the range and the width of the beaten ground? A. Between 500 and 1000 yards the width of the beaten ground in yards is about equal to the number of hundreds of yards in the range.

3162. Q. Taking the effect of collective fire at 500 yards as unity, what is the approximate value of collective fire at 800, 1200, and 1700 yards? A. Respectively,  $\frac{1}{2}$ ,  $\frac{1}{16}$ ,  $\frac{1}{36}$ .

3163. Q. The depth of the nucleus at practicable ranges being 100 yards, what is the limit of error of estimation of ranges to exceed which will make the fire haphazard? A. Fifty yards; half the depth of the nucleus.

3164. Q. How is the limiting range at which collective firing is advisable found? A. By dividing 50 by the probable error.

3165. Q. When the difficulty of estimating the range to within half the depth of the nucleus becomes great, what means are taken to insure some portion of the nucleus being struck, and at what range do these means come into play? A. Combined sights, at 500 yards.

3166. Q. Explain what is meant by "combined sights." A. When a body of men firing are divided into two or more parts, and each part uses a different elevation from the others, at the same time firing at the same object, the whole are said to be firing with combined sights.

3167. Q. What is the effect of using combined sights? A. To increase the depth of the beaten ground and to lessen the density of the hits.

3168. Q. Since the use of combined sights increases depth of beaten ground at the expense of density of hits, what is it necessary to do in order to avoid the latter? A. Increase the expenditure of ammunition either by increasing the number of men firing or the number of rounds for each.

3169. Q. In practice, how much greater and less than the estimated range is it usual to make two elevations, and what elevations are taken when three are used? A. When two elevations are used one is 50 yards less and one 50 yards greater than the estimated range; when three elevations are used one is 100 yards less than, one 100 yards greater than, and one for, the estimated range.

3170. Q. Assuming that the error of estimating the range may be reduced to .10, what rule may govern as to the number of sights employed? A. Up to 500 yards use one elevation for the range. From 500 to 1000 yards use two elevations—one 50 yards less and one 50 yards greater than the supposed distance; beyond 1000 yards use three elevations—one for the supposed range, and one 100 yards greater and one 100 yards less.

3171. Q. Considering the decrease in efficacy of fire, using combined sights, what means should be employed to make it unnecessary? A. Every available means to ascertain the range within 50 yards.

#### THE EFFECTS OF COLLECTIVE FIRING.

3172. Q. State the relative values of the results obtained in experiment, range estimated with the use of one and two elevations? A. The use of two elevations gives better results than the use of only one.

3173. Q. Which formation is the less vulnerable—the line or the column? A. The line.

3174. Q. What is the limiting range for collective firing at a company column, standing, range known? At a company in line,



standing? A. In the first case about 1500 yards. In the second case about 900 yards.

3175. Q. What effect has the increased height of cavalry over infantry on the limiting range? A. To increase it.

3176. Q. With range known, at what limiting range does experiment show artillery to suffer from infantry collective fire? A. Thirteen hundred yards.

3177. Q. In what ways may control of fire increase its efficacy? A. 1. By concentrating it. 2. By selection of the most suitable objects. 3. By using the best obtainable information as to the range. 4. By using combined sights.

3178. Q. In what way does control of fire insure economy of ammunition? A. It prevents useless expenditure at unprofitable ranges, and when the enemy are concealed.

#### INFLUENCE OF GROUND.

3179. Q. Define "rising" and "falling" ground, tell what ground the terms apply to, what its extent, and which is visible to the firer and which invisible. A. By "rising" and "falling" ground is meant the kind of slope at the points where the bullets fall—rising or falling, in the direction of fire, with respect to the line of sight. In general it is supposed to extend throughout the dangerous zone. Rising ground is visible and falling ground invisible to the firers.

3180. Q. What is the "apparent crest" of "rising" or "falling" ground? A. It is the point where the line of sight touches it.

3181. Q. What is a "grazing fire" as applied to rising or falling ground? A. It is a fire in which the bullets pass over the ground at a height less than that of the objective.

3182. Q. What is the "surface of reception"? A. It is the portion of ground on which the bullets fall.

3183. Q. What is the "defiladed zone"? A. It is the depth of ground that any obstacle shelters from bullets fired from any distance.

3184. Q. What is the "protected zone"? A. For any object or obstacle it is the difference between the defiladed and grazed zone.

3185. Q. How do rising and falling ground affect the depth of the dangerous zone? A. Falling ground increases it; rising ground decreases it.

3186. Q. What is the effect of falling ground on the depth of the dangerous zone? A. When the angle between the surface of reception and the line of sight is equal to the angle of drop at the crest the depth of the dangerous zone is doubled; when that

surface drops as many yards in 100 as there are hundreds of yards in the range, the depth of the dangerous zone is five times that on ground parallel to the line of sight. A further increase in the inclination of the surface of reception tends to form defiladed zones.

3187. Q. In order to sweep the summit of a level plateau from a point below and in front of the crest, at what range should the fire be delivered? A. At as many hundreds of yards range as there are units in the square root of the relief of the crest in yards.

3188. Q. What influence on number of elevations employed has sloping ground? A. On rising ground the dangerous zones are shorter, hence increase the number of elevations; on falling ground the dangerous zones are deeper, hence decrease the number of elevations.

3189. Q. What is the relative value of ricochets on rising and falling ground as compared with their value on level ground? A. Their value is greater on falling ground and less on rising ground.

3190. Q. What three ways are there of occupying the ground for the defense of a position on an elevated plateau? A. 1. The crest may be strongly held. 2. The crest may be lightly held for the sake of observation, and abandoned at an opportune moment, while the main line of defense is placed from 500 to 800 yards in rear of it. 3. A line in front of the crest may be held by the infantry, leaving the crest for artillery as a cover for the reserves. (For discussion of this subject see 'Infantry Fire,' pages 122 to 140.)

#### LONG-RANGE FIRE.

3191. Q. What is the extreme range beyond which infantry fire should not be used? A. 1300 yards.

3192. Q. By which party, the attack or the defense, is fire between 800 and 1300 yards chiefly used? A. The defense.

3193. Q. To which arm should fire beyond 1300 yards be left? A. The artillery.

3194. Q. Are battles ever won by long-range fire? A. No; they are always fought out at short ranges.

3195. Q. Define "fire of position." A. It is the fire of auxiliary bodies established under cover at from 700 to 1300 yards from the position to be assailed where they can be easily supplied with ammunition. These bodies fire during the advance.

3196. Q. Under what topographical conditions alone is it advisable to resort to "fire of position"? A. When the position assailed is on falling ground situated above the firers.

## DIRECTION AND CONTROL OF FIRE:

3197. Q. What is the chief source of superiority of fire? A. Concentration on chosen objectives.

3198. Q. How may the functions of those concerned in the firing in battle be classified? A. To the commanders of the firing line belongs the direction of fire; to the commanders of subdivisions, the control; to the men, fire discipline.

3199. Q. Specify the duties of the captain of a company in battle with reference to the direction and control of fire. A. He determines the objects to be fired on, the nature of the fire, and the fractions of troops to be thrown into the firing-line during the whole period of preparation. He watches that the fire does not deviate from the direction which he has assigned to it, and tries to control it up to the last moment.

3200. Q. Specify the duties of sectional commanders in battle with reference to the direction and control of fire. A. In accordance with orders received they indicate to the men the sights to be used, point out the objectives to be aimed at, the number of cartridges to be fired, and regulate the intensity and duration of the fire.

3201. Q. Specify the duties of group commanders in battle with reference to the direction and control of fire? A. They see that the orders are carried out concerning the sights to be used, the objectives to be fired on, the pauses and re-opening of the fire—in a word, to assure the execution of the orders.

3202. Q. What general rule should always govern the selection of the moment for opening fire in battle? A. Reserve the fire as much as possible for the decisive ranges.

3203. Q. What advantage may result from the defenders of a prepared position opening fire upon the assailant at considerable ranges? A. Besides the actual loss inflicted it compels the assailant to undergo the fatigue and delay of early deployment and a long advance in extended order.

3204. Q. Should the assailant in battle be influenced by the effectiveness of the enemy's fire or his own, in choosing the moment for opening fire? A. His own.

3205. Q. In the general case of an attack over ground which is not particularly favorable to a safe approach to within 400 yards of the enemy, at what range must fire be opened by the assailant? A. At some distance between 800 and 400 yards.

3206. Q. What practically determines the choice of objectives for the assailant in battle? A. The point of assault. The objective will usually be the defender's firing-line at this point, including support and reserves if they appear in sight.

3207. Q. What is the defender's first rule in choosing objectives in battle? A. The defender, if the enemy is making a serious

attack in his front, will fire on the leading echelon of that arm which, for the moment, constitutes the chief danger of the defense, if this echelon be within effective range.

3208. Q. Even though a threatening advance of the assailants in battle is known to be intended as a demonstration only, should they not be fired on, and why? A. They should be fired on so as to prevent any attempt to change the demonstration into the real attack.

3209. Q. What is the defender's second rule in choosing objectives in battle? A. He will choose the first objectives among the groups of the nearest echelons which threaten the greatest danger; that is, advanced groups. "There is not a doubt that in annihilating them we destroy, in the germ, all the initiative power of the rest of the mass."

3210. Q. Name the exceptions to the rule that the defender should choose, as objectives in battle, the advanced groups of the nearest echelons? A. One is in the case when an attack begins with an artillery duel. The fire will be directed on the assailant's guns, or on mounted officers sent to reconnoitre or to carry orders, during the preparatory stage of the attack. Another exception is when the most advanced echelon of the attack can no longer advance. The fire will then be directed on objectives in the second and third echelons as they advance; or, if the firing-line is halted for any reason, and offers very bad objectives, then the fire may be directed on objectives in the second and third echelons, if suitable ones can be found.

3211. Q. What are some of the evils attending a too frequent change of objectives in battle? A. A loss of time in changing sights; a waste of lead from firing at new ranges; a scattering of losses, which robs them of their moral effect.

3212. Q. Defeat of the enemy being the purpose of every action, and shelter from his fire being secondary, what is the prime requisite which makes cover available for use in battle? A. It should permit a good view of the enemy.

3213. Q. What means should be resorted to, to determine the ranges in a defender's front while there is yet time before an attack? A. The defender should measure the distance of any prominent objects in his front from the various portions of his position, in order to fire on the assailant as he reaches them. Information should be asked from the nearest troops, especially the artillery; maps should be consulted, range-finders used, and, on ground suitable for observation, trial-volleys employed.

3214. Q. What effect upon shooting has the combination of the excitement of battle and a down-hill range? A. The men are apt to fire higher than when firing up hill; hence less elevations.

3215. Q. At what range only is fire ever delivered at cavalry in battle? A. At short ranges.

3216. Q. What is the principal effect sought in employing fire

against charging cavalry? A. To break the dash or *élan* of the charge by bringing down a number of horses.

3217. Q. How many rounds of ammunition should be provided each man in an advance on a position beginning at 800 yards?  
A. 120.

#### KINDS OF FIRE TO BE USED.

3218. Q. What conclusion results from a comparison of controlled and uncontrolled fire in battle? A. The conclusion is that some one of the forms of controlled fire should be used as long as this is practicable, and that every means should be adopted which increases the possibility of control.

3219. Q. How are the two kinds of controlled fire broadly distinguished from each other, and what are they called? A. The one kind, called mass-firing (or, in the Drill Regulations, "fire with counted cartridges"), produces a rain of bullets, continuous while it lasts; the other kind, called volley-firing, causes a mass of bullets to fall suddenly and together.

3220. Q. What particular attribute of volley-firing gives it superiority of moral effect in battle? A. Its suddenness.

3221. Q. What is the number of volleys not to be exceeded in battle without a pause of some length? A. Not more than four successive volleys ought to be fired, without a pause of some length, in order that control may not be lost.

3222. Q. During what portions of a battle is volley-firing appropriate for the defender to use? For the assailant? A. By the defender volleys are employed as long as possible—even at the last moment, when the assailants dash forward to the assault. For the assailant volleys belong to the preparatory or long-range stage of the action. They are delivered by those detailed for the purpose, and not by those who are to actually make the assault.

3223. Q. What kind of controlled fire succeeds volley-firing as a battle progresses, and how long should it continue before pausing? A. Mass-firing, which should not exceed three or four rounds; the number of rounds is fixed beforehand, or the firing may be stopped by whistle-signal.

3224. Q. When deployment becomes necessary in battle, and volley-firing by large bodies becomes impracticable as a consequence, what form of volley-firing may yet be resorted to, in preference to mass-firing, and before the fire passes beyond control? A. The fire of group-volleys. The firing-line is divided for this purpose into groups under recognized leaders.

#### THE FIRE UNIT.

3225. Q. What is the fire unit—what is its object, and what is its size in our service? A. The groups into which the firing-line is divided, under recognized leaders, are called fire units.

The object of this division is to retain as long as possible, in the noise and excitement of battle, control over the fire, and to insure transmission of commands to the man who holds the rifle. In our service the group, to which the name "squad" has been given, consists of eight men, including the leader.

3226. Q. What means should be employed to repair the damage to groups in battle from increasing effectiveness of the enemy's fire—the inevitable drifting of the men to the right and left, and the unavoidable mixing of the larger units? A. The men should be trained to form new groups when their own are broken up, and, when their leaders are killed or wounded, to place themselves voluntarily under the nearest leader. Commanders of platoons and sections must be on the alert in battle to appoint fresh group-leaders in place of those lost.

#### SUPPLY OF AMMUNITION IN THE FIELD.

3228. Q. In a system of ammunition supply in the field, how is the ammunition carried? A. Partly by the soldier, partly by battalion ammunition wagons, and partly by ammunition parks.

(For description of a system of ammunition supply, see text, p. 193 *et seq.*)

#### RAPIDITY OF FIRE.

3229. Q. When is the proper time to use rapid fire in battle, and what limit of time should it not exceed without pause? A. Rapid fire should be used at the favorable, though usually short, intervals which may occur during all stages of the fight, and should not last more than five minutes without pause.

#### TACTICAL DEDUCTIONS.

3230. Q. Should Strategy or Tactics be the principal subject of military study, and why? A. Tactics, because few officers are called on to command strategical units, while every officer ought to know how best to use the men, arms, and ground at his disposal.

3231. Q. How is the predominant influence of infantry shown by battle experience? A. It is shown by the fact that, as infantry gains or loses ground, it draws with it the other arms. Example: At the battle of Königgratz the superiority of the Austrian artillery and the vigor of their cavalry charges were of no avail after the infantry was defeated.

3232. Q. What change of formation for attacks has been necessitated by the dissolving effect of modern fire? A. Successive lines in extended order must be substituted for the old column of attack.

3233. Q. Describe in general terms the manner of assaulting

a position. A. Masses are sent forward over the fire-swept zone in extended order and in successive lines; troops in rear are the feeders for the firing-line, intended to keep up its fire-power, carry forward the wave of attack, and finally, when assaulting distance is reached, to break the enemy's line. The moment for reinforcing the firing-line is when its energy is nearly expended, and there is a strong tendency to halt. When the point of assault has once been determined, the movement should be simultaneous and continuous from front to rear of the attack, and the reserves should be ready. Combined with this frontal attack there should be a flank attack.

3234. Q. What is the distinction between attack and assault? The attack is general; assaults are local, in order that the assailants may be superior in force at the points of assault.

3235. Q. What are the relative values of shock and fire as factors of victory in modern war? A. "Fire is the great, the principal, and almost the only force in battle; the shock is only a secondary incident." (Lewal.)

3236. Q. What rule should always be followed as to the number at first deployed in the attack formation? A. The firing-line from the start should have as many rifles as, from the nature of the ground, can be brought effectively into play.

3237. Q. In what does preparation for an attack consist? A. It consists in so demoralizing the defenders by fire of artillery, or of artillery and infantry combined, that the assaulting lines are able to live and arrive at assaulting distances.

3238. Q. What is the best safeguard from an enemy's fire at the disposal of the attack? A. Rapid movement over the fire-swept zone, which reduces the time during which fire can act, and also the chances of finding the ranges with any accuracy.

3239. Q. Which dimension, depth or width, should characterize attack formations, and why? A. Depth, because troops once engaged, can no longer be moved to the right or left, nor can they be withdrawn and used elsewhere; the front line must therefore be constantly and continuously reinforced from the rear.

3240. Q. The attack having been successful, what means should at once be employed to repair the resulting disorganized condition of the victors, and what are the benefits from such repair? The troops should be re-formed as speedily as possible. They can never know whether there is not a second line of defense against which a disorganized advance would be stopped, and a first success turned into a defeat.

3241. Q. How many lines of attack should there at least be? A. Nine.

3242. Q. How is the distance between lines of attack regulated? A. Solely by the consideration of prompt and timely reinforcement.

3243. Q. How many men per yard of front should the attack have? The defense? A. The attack, 12 to 14; the defense, 7 to 10.

3244. Q. Give an account of the normal attack formation suggested in "Infantry Fire." A. See text, p. 234; also, Plate II.

#### PLUNGING FIRE, ETC.

3245. Q. What is "plunging" and what "indirect" fire? A. Plunging fire is that which is used against an object close behind a covering mass. Indirect fire is that used against an object at a considerable distance behind a covering obstacle. Both find their principal use in sieges.

3246. Q. Upon what does the efficacy of plunging fire depend? A. Upon the angle of drop and the height of the obstacle; knowing which, the defiladed and protected zones, and therefore the suitable range, may be calculated.

3247. Q. Up to what range may night-firing be efficacious? A. 600 yards.



## PART X.

### *MINOR TACTICS.*

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TEXT-BOOKS: { *Shaw's "Elements of Modern Tactics."*  
                  { *Wagner's "Security and Information," etc.*

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FOR SECOND LIEUTENANTS OF ALL ARMS—Nos. 3351-3590.

FOR FIRST LIEUTENANTS OF ALL ARMS—Nos. 3248-3590.

FOR CAPTAINS OF ALL ARMS—Nos. 3248-3837.



## PART X.

### MINOR TACTICS.

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#### MINOR TACTICS.

3248. Q. Before commencing to study the principles of modern tactics, what is it necessary for an officer to learn? A. Not only to learn and understand the details of his own arm of the service, but also to have a fair acquaintance with the working of the sister arms.

3249. Q. What method has most commended itself to military students? A. The method of working out exercises or studies on each portion of the subject discussed.

3250. Q. What should these exercises be at first? A. Of an elementary character.

3251. Q. When might instruction in tactics be considered complete? A. Not until the student has had opportunities of working out similar exercises practically on the ground, with or without the help of troops.

3252. Q. How should instruction in tactics be arranged? A. So that the theoretical and the practical can go hand in hand, and be worked in one with the other.

#### DEFINITIONS.

3253. Q. What is the definition of *tactics* in a military sense? A. *Tactics*, as distinguished from *strategy*, means the art of handling troops in the presence or in the immediate neighborhood of an enemy. *Strategy* is the art of conducting the greater operations of war by movements that take place out of sight of or at a distance from an enemy.

3254. Q. What is a *tactical unit*? A. It is an expression denoting the body of troops of each arm considered most suitable for one man's independent command.

3255. Q. What is a *group*? A. A number of men, whether of infantry or cavalry, of any number from two upwards, until it

arrives at the strength of a sub-unit; as, for instance, a section of infantry.

3256. Q. What is a *vedette*? A. A cavalry mounted sentry, posted in a fixed position, when a continual lookout is necessary. This term is restricted to mounted sentries posted by cavalry pickets.

3257. Q. What is a *scout*? A. In cavalry there are two kinds, employed either for the sole purpose of examining ground over which a body of troops is to pass, which is called a *ground-scout*; or else being detached for ordinary reconnoitring purposes from a patrol or reconnoitring party, termed an *advanced scout*. A scout in infantry is usually applied to an ordinary reconnoitrer detached from a patrol.

3258. Q. What is meant by *frontage*? A. The extent of ground occupied by the front rank of a body of troops, in whatever formation they may be.

3259. Q. What is an *interval*? A. It is the lateral space between men or bodies of troops in frontage.

3260. Q. What is *distance*? A. The space between men or bodies of troops from front to rear.

3261. Q. What is *depth*? A. The space taken up by a body of troops from front to rear.

3262. Q. What is a *column of route*? A. A formation for moving on a road with a narrow front, when on the line of march. In cavalry the term is more particularly applied to columns having no broader front than that presented by a column of sections; in infantry, the formation is usually that of fours; in artillery, the front is invariably that of one carriage only, the guns and wagons of each subdivision succeeding one another.

3263. Q. What does a *field column of route* in artillery mean? A. It means that the wagons are detached and follow in rear of the guns.

#### FUNCTIONS OF THE THREE ARMS.

3264. Q. Which of the three arms is the only one that can act independently under all circumstances? A. Infantry, whether in attack or defense, in motion or at rest.

3265. Q. What is the action of infantry? A. Fire-action, shock-action, and a combination of the two.

3266. Q. Which action is the most important at the present day? A. Fire-action. Superior fire is accompanied by moral effect, which helps to insure success; hence every means should be taken to increase the effect of fire-action upon the enemy, and to neutralize as far as possible the effect of fire-action on the part of the enemy.

3267. Q. To secure a full completion of victory what should the offensive fire-action of infantry be supplemented by? A. By shock-

action at the right moment; as, for example, the final assault of a position, preceded by infantry fire during the advance.

3268. Q. What is necessary to give the fullest success to the defensive fire-action of infantry in position behind cover? A. When the attacking force hesitates or becomes demoralized, the action must be changed into offensive fire and shock-action combined. This is called giving the counterstroke.

3269. Q. In what case should defensive fire-action only be permitted? A. When the infantry is acting as a support to artillery. Their function is almost purely defensive, and they should rarely, if ever, leave their position to attack or pursue.

3271. Q. How should the first line of attack be subdivided? A. Into a firing-line in extended order, followed by its immediate supports, broken up into fractions, more or less dense and more or less separated, and backed up by a reserve kept as long as possible in small columns or in line, but liable to be opened out if the weight of the enemy's fire is felt.

3272. Q. What are the duties of the first line in action? A. To keep up a well-directed fire on the enemy; by a steady advance to establish itself as near the position as possible; and thence to open such a heavy fire that the second line may be enabled to approach the point of attack for the purpose of assault.

3273. Q. How may these duties be best effected by the firing-line? A. To effect this the firing-line is progressively reinforced from the rear during the latter part of the advance: first by its supports, and finally by its reserve, so that its full fire-action is developed at the critical moment.

3274. Q. When the second line passes through the first line to assault, what is done by the first line? A. It ceases its fire, and joins in the attack of the position.

3275. Q. If there be a third line, what action is taken? A. It follows and confirms the success.

#### TACTICAL UNIT OF INFANTRY.

3276. Q. What is the tactical unit of infantry for the U. S. Army, and of what is it constituted on a war basis? A. The battalion, composed of four companies, of four hundred men, and thirteen officers.

3277. Q. What is the approximate frontage of infantry? A. A company, about 39 yards; a battalion, about 162 yards; in line of companies in columns of fours, the depth in close column; in column of files, 3 yards, but may be reduced to 22 inches; in column of twos, 4 yards, but may be reduced to 50 inches; in column of fours, 5 yards, but may be reduced to 3 yards; in line of platoon columns, frontage in line, 20 yards; in line of platoon columns with closed intervals, 100 yards.

3278. Q. What is the approximate depth of infantry? A. In

line, about 5 yards ; in column of fours, the frontage in line plus 18 inches ; in column at wheeling distance, the frontage in line less the frontage of the leading subdivision plus depth of the last ; in close column, seven times the number of companies less 2 yards ; in line of platoon columns, 24 yards.

3279. Q. Give the rules for calculating the frontage and depth of infantry, and an example of the calculation ? A. For the front of a company multiply the number of files by 28 inches, adding space of right and left guides minus 6 inches.

*Example.*

$$\begin{array}{rcl} 48 \text{ files} \times 28 \text{ in.} & = & 1344 \text{ inches.} \\ \text{R. and L. guides (less 6 in.)} & = & \begin{array}{r} 50 \\ \hline \end{array} \text{ "} \\ 1394 \div 12 \text{ in.} & = & 116 \text{ ft.} = 39 \text{ yds.} \end{array}$$

For the frontage of a battalion, multiply the frontage of a company by the number of companies ; then multiply the space between companies by 3, and add products of both.

*Example.*

$$\begin{array}{rcl} 1394 \text{ in.} \times 4 & = & 5576 \text{ inches.} \\ 90 \text{ in.} \times 3 & = & \begin{array}{r} 270 \\ \hline \end{array} \text{ "} \\ 5846 \div 12 & = & 487 \text{ ft.} = 162 \text{ yds.} \end{array}$$

For the depth of infantry in line, add the thickness of each line of officers and men to the distance between each line.

*Example.*

$$\begin{array}{rcl} 12 \text{ in.} + 60 \text{ in.} + 12 \text{ in.} + 16 \text{ in.} + 12 \text{ in.} + 60 \text{ in.} \\ \div 12 \text{ in.} & = & 15\frac{1}{2} \text{ feet.} \end{array}$$

3280. Q. How is frontage and depth measured ? A. The frontage of two battalions in line includes the interval between one battalion and the other ; depth of a battalion in column would be measured from the front of the leading front rank to the rear of the extreme rear rank of the column, including the distances between one company and another.

3281. Q. What is the ordinary pace of infantry in manœuvre ? A. On the march, during field operations, about 3 miles an hour, or 88 yards per minute. In advancing after firing has commenced, it would be about 40 yards per minute ; in advancing by rushes (taking advantage of cover), about 20 yards per minute. In double time, the pace is increased to 5 miles an hour for short intervals, or about 146 yards per minute.

3282. Q. How may the time required for a movement be calculated ? A. By knowing the distance to be passed over, and the pace decided, and applying the data previously given,

3283. Q. How may the strength of a column or party of the enemy's, infantry be approximately estimated? A. By noting the time occupied by the force in passing a fixed point, together with its pace and formation, and applying the data previously given, deducting, when necessary, in the calculation for opening out or straggling on the march.

3284. Q. What is the simple formula for ascertaining the numbers in a column? A. The depth having been ascertained in paces, twice the number of paces gives the strength of the column.

3285. Q. A column of infantry in fours takes  $5\frac{1}{2}$  minutes to pass across an opening under observation. Pace 88 yards per minute, what is the strength of the column? A.  $88 \times 5 + \frac{88}{2} = 440 + 44 = 484$  yards, the actual length of the column, or 580 paces. Deduct 10 per cent for opening out = 522 paces, which represents a force of 522 files, or 1044 men.

#### CHARACTERISTICS OF CAVALRY.

3286. Q. How is the action of cavalry divided? A. Into shock-action, in line; into detached action, either singly or in small parties; into dismounted fire-action.

3287. Q. What does the leading principle of the action of cavalry in battle consist in, and why? A. In attack, even while acting on the defensive; because at the halt, unless dismounted, it is comparatively defenseless. While mounted it should keep out of fire until it can itself attack.

3288. Q. To be efficacious, when should the shock-action of cavalry be applied? A. At the moment the commander deems the most propitious for a successful result, and the charge should then be as impetuous as possible; the main conditions for success being rapidity and surprise in the advance, and vigor and momentum in the shock.

3289. Q. What should be done by cavalry after the charge? A. It should either pursue the enemy or rally as quickly as possible, according to circumstances.

3290. Q. How should cavalry cover the retreat of a defeated army? A. It must continue to act vigorously on the offensive, as the best means of defense, both for itself and the other arms; it should operate under every disadvantage of time and place, and often at the risk of total destruction.

3291. Q. In what formation should cavalry always manœuvre? A. In column. The particular formation depends much on the ground; but small columns are the most mobile and flexible.

3292. Q. In what formation should cavalry fight? A. In line, or rather in a succession of echelon of lines.

3293. Q. What are the uses of reserves, echelons, and ground-scouts during an attack? A. The reserve follows in rear, to a

flank or flanks ; and it must protect the retreat if the charge is unsuccessful, or complete the victory if successful. Every attacking body of any strength should protect its flanks; or, at all events, its exposed flank, by echelons, during its advance. The ground over which cavalry is to act should be reconnoitred by ground scouts thrown out to the front and flanks, so that the advance may not be checked by unforeseen obstacles.

3294. Q. Which are the weak points of cavalry, and where should an attack be made? A. The flanks are the weak points, and if possible an attack should be made on them, and when in the act of deploying.

3295. Q. Cavalry, in attacking infantry, should seek what advantages? A. Infantry should be attacked by cavalry in flank when in motion, when demoralized or broken by artillery fire, or be surprised.

3296. Q. When should artillery be attacked by cavalry? A. When in motion, or when limbering or unlimbering. Artillery in position should only be attacked in flank or in rear ; the support, in such case, if there is one, must be simultaneously charged by a portion of the force.

3297. Q. What is the main use of cavalry of the present day, and what does that include? A. Its main use is in its detached action, which includes all reconnoitring, screening, escort and messenger duties.

3298. Q. What has been the value of the dismounted fire-action of cavalry? A. It has been pretty generally acknowledged of late that cavalry must fight on foot under certain conditions. The dismounted action of cavalry was first employed by the United States forces, and with great success, during the War of the Rebellion. It has been since employed with good results in the latest European campaign, by the Russians. [The tactical importance of this subject may be more fully discussed by the student in this answer.]

#### TACTICAL UNIT OF CAVALRY.

3299. Q. What is the tactical unit of cavalry? Give strength. A. The tactical unit is the squadron. It consists, on a war footing, of 4 troops of 400 men and 14 officers.

3300. Q. What is the strength of a cavalry brigade, in round numbers? A. 3600 men and about 140 officers.

3301. Q. What is the rate of speed per hour and per minute of the walk? of the trot? of the gallop? A. The rate of walk is 4 miles an hour, or 117 yards in a minute ; the trot is 8 miles an hour, or 235 yards per minute ; the gallop is 12 miles an hour, or 352 yards per minute.

3302. Q. What is the speed of an orderly, or messenger? A. The gallop may be taken for a mile ; beyond that distance it



should be alternately trotting and galloping at 10 miles per hour, or 293 yards per minute.

3303. Q. From the aforementioned data, what two simple problems may be solved? Give example. A. *First.* The distance passed over being known and the pace decided, the time required for a movement can be calculated. *Second.* The strength of a force of cavalry may be approximately estimated by noting the time it occupies in passing a fixed point, together with its pace and formation, sufficient deduction being made, when necessary, in the calculation for opening out or straggling. Example:—

#### CHARACTERISTICS OF ARTILLERY.

3304. Q. How are light field and horse batteries armed? A. With  $3\frac{3}{16}$ -inch steel guns (breech loading).

3305. Q. How are U. S. heavy batteries armed? A. Heavy field batteries are armed with  $3\frac{6}{16}$ -inch guns.

3306. Q. What is the function of artillery in battle? A. To prepare for and support the attacks of infantry and cavalry, or to defend them when attacked, rather than to act independently, without their presence.

3307. Q. What is the only method of action of artillery? A. It is confined to fire-action.

3308. Q. Give table of zones of rifle-fire, aimed and unaimed.

A.	Zone.	Description of Fire.	Limits.	Range.
	1st	{ Useful field artillery }	3000 to 1700 yards	Extreme
	2d	{ Limit of Rifle }		
	3d	{ Unaimed Rifle }	1700 to 800 yards	Long
		{ Aimed Rifle }	800 to 400 yards	Medium
			400 to position	Short

3309. Q. Describe in detail the zones of artillery fire, and show how they are affected by rifle-fire. A. With reference to the distance of the guns from unshaken hostile infantry, artillery fire may be divided into three zones, as follows:—

*First Zone.* From 3000 to 2000 yards. Within this zone artillery fire is effective, and ordinarily has very little to fear from the fire of infantry. *Second Zone.* From 2000 to 800 yards. As it approaches and enters this zone artillery fire increases its effect, but is exposed to great danger from infantry fire, which danger increases with great rapidity as the range diminishes. *Third Zone.* Within 800 yards. Unless well covered, artillery is brought into action within this zone only in exceptional cases of absolute necessity, and even then at the risk of annihilation.

3310. Q. What is the extreme useful limit of field-artillery fire under ordinary conditions? A. Under favorable conditions artillery fire has been used effectively considerably in excess of 3300 yards.

3311. Q. What is the objective of artillery? A. To direct guns upon that arm of the enemy which is at the time the most predominant. At each stage of an action one arm is for the moment the principal one, and should be checked by opposing fire; but if any doubt arises as to which threatens most, troops rather than guns should then be the objective.

3312. Q. In selecting positions for artillery, what is the leading consideration? A. The first and leading principle is that fire-action against the enemy should be as little as possible impeded by any accidents of ground.

3313. Q. When should the guns be intrenched? A. When a defensive position is to be taken up and held.

3314. Q. What positions should be avoided? A. Well-defined and isolated positions, and no cover for the enemy's infantry should be within effective rifle range unless the guns are completely protected from it.

3315. Q. What should the artillery reserve consist of? A. It should consist of men, horses, and ammunition rather than of guns, because the guns themselves are seldom disabled by the fire of the enemy, and can continue in action as long as they are manned, and have horses to move them when necessary.

3316. Q. Compare the moral and physical effects of artillery fire. A. The moral effect of artillery fire upon troops going into action is very depressing. Many instances occurred, however, during the war of the Rebellion where the physical effect of guns in action decided the day; and it must be remembered that a great part of artillery fire is directed against troops under cover, where, if it produces but little physical effect, that of infantry would produce probably none at all.

3317. Q. Name the various kinds of artillery fire, with reference to the horizontal plane. A. *First*.—With reference to the horizontal plane: *Front* or *frontal* fire is that which is directed perpendicularly, or nearly so, to the general line of troops fired at. *Oblique* fire is that which is directed obliquely to the line of troops fired at. *Enfilade* fire is one which rakes the enemy's line of troops. *Flanking* fire must be directed along the front of, or nearly parallel to, the line to be flanked or defended. *Cross-fire* means that the projectiles from guns in different positions cross one another at a particular point of ground. *Second*.—With reference to the vertical plane: *Direct* fire is that from guns with service charges at all angles of elevation not exceeding 15°. *Indirect* or *curved* fire is that from guns with reduced charges at all angles of elevation not exceeding 15°. *High-angle* fire is that directed from guns at a greater elevation than

15° with any charges. This term now includes what used to be called vertical fire.

3318. Q. Describe Common Shell, Shrapnel, and Case-shot, and state where each is chiefly useful. A. *Common shell* is a hollow cast-iron elongated projectile, filled with a large bursting-charge of powder. It bursts into a few large pieces, and is sometimes used at long ranges against troops in mass, but chiefly against buildings or obstacles, and to fire combustible materials. It is also employed for shelling villages, stockades, etc. It is painted black.—*Shrapnel shell* is packed with bullets, which are liberated in their flight at the proper moment by a small bursting-charge of powder breaking open the outer case. This projectile is used against troops in all formations when in open view. The effect of shrapnel depends upon the velocity of the shell at the time of bursting. With the old M. L. guns it was very effective up to 2500 yards, and moderately so up to 3500 yards; but the new B. L. field-guns have much higher velocities, and their shrapnel-fire is proportionately more powerful. Shrapnel is distinguished from common shell by the head being painted red, the body black.—*Case-shot* consists of a thin metal cylinder packed with small balls. The case breaking by the discharge, the balls are liberated at the muzzle, and spread over considerable space. Case-shot is used up to an extreme range only of 350 to 400 yards. If the ground in front of the enemy is hard or stony, the result is more effective. Case is employed against cavalry or infantry at close quarters. Shrapnel-shell loaded the reverse way, without plug or fuse, may also be used as case, on emergency, within 100 yards. Its effect is very great.

3319. Q. Name and describe the two general classes of fuses, and show where each may be used with best results. A. The fuses used with shell are either *percussion-fuses* or *time-fuses*, names which explain themselves. Percussion fuses are more reliable than time-fuses. They are more generally used with common shell than time-fuses, the limit for error permissible in the case of the common shell being very small. It must burst at or close to the object in order to be effective. Time-fuses are more applicable to shrapnel, which should burst more or less short of the object aimed at. The greater the range, the nearer to the object should the point of bursting be. At short ranges, say under 1500 yards, the distance may be as much as 200 yards; but at long ranges, there is such a loss of final velocity, and the angle of descent is so much increased, that about 50 yards short of the object is found to be sufficient. Shrapnel may be used effectively with percussion-fuses on occasions when it can be fired at short ranges over hard ground.

3320. Q. What ammunition is best to be used against troops in the open? A. Shrapnel, as it gives much more destructive results.

3321. Q. What does the effect of shrapnel depend upon? A. Upon the velocity of the shell at the moment of bursting and the exact timing of the explosion, so as to give best effect on the object aimed at.

3322. Q. What are two general methods of determining ranges? A. Unless range-finders are in use or the distance be known, percussion-fuses should be used until the range is ascertained.

3323. Q. What projectile is best to be used against troops or guns under cover, and what is the nature of its effect? A. Common shell should be employed for shelling them out of villages, houses, or woods, or when behind obstructions of almost any kind. Its explosion creates much heat, and easily sets fire to houses. Its effect upon the troops is doubtful, except as shaking the nerves of the enemy, compelling him to lie close, while infantry may advance unmolested to attack.

3324. Q. Is it ever advisable to fire over the heads of one's own troops? A. Common shell and shrapnel, with proper care, may be so fired if necessary; but it is very inadvisable to do so, unless the distance from the guns to the troops over whom it is fired is considerable. The action of case-shot, being too uncertain and scattering, should never be fired over the heads of one's own troops.

#### TACTICAL UNIT OF ARTILLERY.

3325. Q. What is the tactical unit of U. S. artillery, and what is its strength? A. The battery, consisting of six guns, with a strength of 5 officers and 175 men.

3326. Q. What are the limits of distance between guns in action and the reasons therefor? A. They should be not less than 10 nor more than 40 yards apart. An interval of less than 10 yards would too much increase the effect of the enemy's fire; an interval greater than 40 yards would render the efficient superintendence of the battery by the captain impossible.

3327. Q. What is the front occupied in action by a battery and by a brigade of four batteries? A. A battery occupies a front which varies from 62 to 125 yards; a brigade of four batteries one that varies from 300 to 600 yards.

3328. Q. How are the men in a battery divided? A. Into gunners (cannoneers), drivers, and artificers.

3329. Q. How are the guns and caissons horsed? A. By teams of from 6 to 8 horses, with a driver to each pair of horses. The pairs are known as *lead*-, *centre*-, (swing), and *wheel*-horses.

3330. Q. What is the composition of the gun detachment of a field-battery, and how mounted? A. It consists of 8 gunners (7 cannoneers, including the gunner and caisson corporal), who march or sit on the gun and wagon (chests of the limber and

caisson), under the command of Number 1 of the gun detachment (chief of section), who is mounted.

3331. Q. What is the smallest number of men by which a gun can be worked efficiently? A. On firm ground, three men, without much diminution of rapidity of fire.

3332. Q. What is the rate of speed per hour and per minute of the walk, trot, gallop, and of the combination of trot and walk? A. The pace of the walk is the same as for cavalry, not to exceed 4 miles an hour, or 117 yards per minute; the trot should be 8 miles an hour, or 235 yards per minute; the gallop 12 miles an hour, or 352 yards per minute; a combination of the two, for horse-batteries, 5 miles an hour, or 146 yards per minute.

3333. Q. What are the methods adopted for estimating the strength of the enemy's artillery? A. The time occupied in passing a fixed point may form an element for calculation, as in the case of the other arms, but it is often possible to count the number of guns. If the depth of the column of route of artillery be obtained by observation, a fair estimate may be made by assuming that each artillery carriage takes up twenty yards of road, which allows for intervals of distance and tailing on the march.

#### MOUNTED INFANTRY.

3334. Q. Various attempts have been made to combine what two methods of action, and for what reason? A. To combine the action of cavalry and infantry; to make a portion of the infantry so mobile as to enable it to act with cavalry in any required enterprise, and to enable it to be moved rapidly from one point to another of the scene of action.

3335. Q. What are the experiences derived from the American civil war? A. That whenever these two functions were combined, some of the best results were obtained; and it is remarkable that the cavalry, making use of dismounted action at times, retained for the most part its power as cavalry at other times.

3336. Q. What is the principal source of information for all writers on this subject? A. Trench, in his "Cavalry in Modern War."

3337. Q. What is this author's opinion regarding dismounted cavalry? A. He concludes, from the narrative of facts and feats which he details, that in the wars of the future dismounted cavalry will have a great part to play.

3338. Q. Examples from the American war are quoted in support of what opinions? A. The examples are equally relied upon by the advocates of mounted infantry and of dismounted cavalry.

3339. Q. What are the author's general remarks on American cavalry? A. That although the cavalry regiments on both sides were more or less of an irregular type, the men in most of the corps, after they had served for a time, became veteran soldiers,

not only expert in their infantry-work, but also skilled and experienced in all cavalry exercises. At one time they were on foot as a shooting-line to meet the enemy's infantry; at another moment mounted to charge the enemy's cavalry.

3340. Q. How may an assailant use mounted infantry as a preliminary to the attack of a position; when artillery has opened upon the enemy beyond rifle-range of his position; when this fire has become severe? A. As a preliminary to the attack of a position, mounted infantry and machine-guns may accompany cavalry and horse artillery, and join the advanced-guard action to drive in the enemy's outlying posts. When the guns have come into action against the posts, at a distance exceeding the infantry range therefrom, the mounted infantry and machine-guns, with part of the cavalry, may advance still further until the posts can be brought under long-range fire of the infantry and machine-guns. As the fire of the artillery has effect, the mounted infantry and cavalry may advance still closer, part of the former dismounting to attack the posts in front, and part passing to a flank with a similar object; the cavalry in each case protecting the flanks of the mounted infantry, and also seizing upon any openings for cavalry attack themselves on the enemy's advanced troops or guns.

3341. Q. How might mounted infantry be used by the defense? A. The mounted infantry accompanies the cavalry and guns sent out to delay the advance of the attacking force, and to deny them possession of strong posts in front of the position. Mounted infantry at this stage assists by its fire to keep the enemy's guns from deploying within effective range of the position.

3342. Q. In what other situations would mounted infantry be useful? A. In making flank attacks and in defense of the same; in raids; in the attack and defense of convoys; in seizing positions far ahead to hold them till the foot-troops come up; and it may at times act independently.

3343. Q. Of what value would mounted infantry be as an escort to artillery? A. It would furnish very efficient aid on account of acting at a distance from other troops; and when detached to act with cavalry and horse artillery mounted infantry would look out for attacks on the artillery as part of their duty, the fire of their rifles being especially utilized to keep off hostile cavalry while the guns are changing position.

3344. Q. Of what value would mounted infantry be for reconnaissance? A. It should not make reconnaissances when cavalry is available. As a rule it should be treated altogether as infantry fighting men, provided with means of rapid movement.

3345. Q. What is the duty of mounted infantry as part of an advance or rear guard? A. The detachment should move on the main route near the van or rear, ready to dash out rapidly if re-

quired to seize, hold, or defend a bridge or defile. They should not be called upon to do the scouting in any direction.

3346. Q. What should the work of mounted infantry be confined to on outpost duty? A. To accompanying strong patrols to the front for offensive purposes, or like duty. They should not be expected to do the reconnoitring; but intelligent, well-mounted men, who have been specially well instructed, may sometimes be put on an advanced look-out post on the Cossack system; or they may move along roads at night in the direction of the enemy as standing patrols, or patrolling posts, to save the cavalry some of their harassing work.

#### SPACE AND TIME.

3347. Q. How may the depth of columns on the march be estimated? A. In a similar manner to that shown in the case of each arm taken separately, the infantry pace being necessarily assumed for the whole column.

3348. Q. What allowance should be made for straggling, from a battalion to an army corps? A. One tenth for a battalion; one eighth for a brigade; one seventh for a division; and one fifth for an army corps.

3349. Q. What might be considered a rough and ready rule for calculating the depth required on the road for a column? A. To allow one yard for each horseman; one yard for every two foot-soldiers, and twenty yards for every gun or vehicle.

3350. Q. What is the pace of small columns? A. A column of all arms combined, restricted to one road, would not exceed 2 miles per hour for an army corps; a division about  $2\frac{1}{2}$  miles, and smaller columns may attain three miles under favorable conditions.

#### SECURITY AND INFORMATION.

[Under this head candidates may elect to be examined in Wagner.]

3351. Q. What is meant by an army in the field being taken at a disadvantage? A. When it is not properly guarded, so as to be warned of the approach of the enemy.

3352. Q. In order to render an army effective, what should be provided for its rest and repose? A. Covering detachments, which, composed only of a small portion of the whole, provide by their watchfulness for the security and tranquillity of the whole force.

3353. Q. What is the position of covering detachments with reference to the main body, and why should it be so? A. They should be advanced to a considerable distance from the main body in the direction of the enemy, so as to give timely notice of his approach or vicinity; and, further, to oppose such a preliminary resistance

to his advance as may give the main body time to prepare for attack.

3354. Q. How is the security of the main body provided for on the march, and how at the halt? A. On the march it should be provided for in its front by detached parties forming an advanced-guard; in its rear by detached parties forming a rear-guard; and by flank-guards on its flanks. If the force be halted, the covering parties are formed into a chain of outposts in fixed positions.

3355. Q. To insure the perfect safety of an army, what else is necessary? A. It is also indispensably necessary to obtain sure and accurate information respecting the enemy's movements.

3356. Q. How is information obtained? A. In two ways: *first*, by the reports of spies, deserters, prisoners, etc.; *second*, by reconnoissance.

3357. Q. What is meant by reconnoissance? A. It may be defined as any movement of troops designing to observe the enemy—his strength, position, or movements; also, the country—its nature and resources.

3358. Q. By whom are reconnoissances made? A. By a large force, by a small party, or by a single man.

3359. Q. How are reconnoissances usually effected? A. By detached forces of cavalry moving out far in advance of the main body, and by reconnoitring parties of cavalry or infantry, or both, or sometimes of the three arms combined, pushed out from the main body or its advanced posts.

3360. Q. What other duties have reconnoitring parties besides collecting information? A. They have what are called screening duties.

3361. Q. What, therefore, constitutes the whole of the arrangements for security and information? A. The advanced cavalry, detached for screening and reconnoitring duties, spread a veil round the force of which they form a part, and contribute to its security by the information which they obtain of the country, the scene of operations, and of the numbers, position and probable intentions of the enemy. Behind the screen or veil, the main body on the march is also protected by its advance-guard, flank-guards, and rear-guard, the duties of which are carried out as strictly as if the cavalry were not in front. Similarly, at a halt, a chain of outposts is immediately formed in front of the army with the same regularity and care as if the veil of cavalry did not exist.

3362. Q. What is done in case of a retreat? A. The rear-guard in this case becomes the most important section of the covering detachments securing safety for the army, and is proportionately stronger than the advance-guard, as being nearer to the enemy; the screen of cavalry is now in rear to assist the rear-guard.

3363. Q. Are the arrangements mentioned always practicable? If there is no cavalry available, there cannot be a screen in ad-



vance; if the ground is not favorable for the action of cavalry, infantry should be substituted for it; or, cavalry may be acting alone and have to furnish its own advance-guard or its own outposts, as well as its reconnoitring parties; or, infantry may be acting alone, depending on itself for all measures of security and information.

3364. Q. State the names of the detachments by which a column is made secure on the march, and give their strength, illustrating by the case of a battalion, a brigade, and a division. A. An advance-guard preceding it, flank-guards on the flanks, and a rear-guard following it. An advance-guard should consist of not less than one sixth of the whole force; the rear-guard one twelfth; the flank-guards, in the case of small forces, would be taken from the advance- and rear-guards. All the detached parties combined should not exceed one fourth of the whole body. Thus, a battalion on the march would have an advance-guard of one platoon, or one eighth of the whole; a brigade, one battalion, or one ninth of the whole; a division, one regiment, or one ninth of the whole.

3365. Q. How is the strength of the advance-guard affected by the commander's intention to fight or not to fight? A. If it is the intention to bring the enemy to a decisive engagement, the proportion of the advance-guard must be large, in order to hold any good position it may have seized, until the main body comes up. Should an engagement be not desired, the advance-guard should be no stronger than absolutely required for security and information.

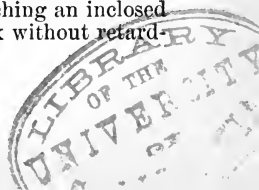
3366. Q. How is the advance-guard governed as to whether it is desirable to bring about an engagement? A. Definite instructions upon this matter should always be given by the commander of the troops to the officer in charge of an advance-guard.

3367. Q. How is the strength of flank-guards determined? A. By the surrounding conditions.

#### THE ADVANCE-GUARD.

[Questions on the subject of the formation and subdivision of an advance-guard are to be found in those on the Drill Regulations from Nos. 652 to 1234.]

3368. Q. What is the duty of the commander of the vanguard? A. To see that the proper road is followed. He should have a map and be able to read it; he should give clear directions to the non-commissioned officer of the advanced party, and if any doubt occurs he must verify the direction himself by going to the extreme front; he should leave a man at all cross-roads where the main column might go astray; and when approaching an inclosed country, where his ordinary flankers cannot work without retarding the march, he must send out special patrols.



3369. Q. What is the great point to be borne in mind by the commander of the vanguard? A. That the advance of the column must not be delayed.

3370. Q. Where do the guides of an advance-guard march? A. They are attached to and march with the support, but should be sent to the extreme front whenever necessary.

3371. Q. How is the support formed? A. On as broad a front as the road will permit.

3372. Q. What is done with regard to reports from the advanced party? A. They should be verified by the commander of the vanguard as far as possible; sometimes it may be desirable to let the same man who brings in the news go on with it to the commander of the advance-guard.

3373. Q. What is the position of the advance-guard commander? A. He remains with the reserve, as a rule; but he often has to move to the vanguard when in touch with the enemy.

3374. Q. What protection may the reserve furnish an advance-guard on the road, and how? A. When specially required, flanking patrols from the reserve may move on each flank, and be employed in examining houses, farms, etc., standing back from the road.

3375. Q. If the advanced party encounters serious resistance, by whom is the fighting done? A. By the reserve. The advance parties feel, observe, and reconnoitre; but when it comes to pushing home an attack, the reserves must be brought up as quickly as possible.

3376. Q. What is the principle on which the rules for the action of an advance-guard is based? A. That it is the essence of the duty of an advance-guard to be successful in repulsing the enemy, or in holding him back a sufficient time.

3377. Q. Does the distance of the advance-guard from the main column vary? State the principles. A. The distance does vary, according to circumstances, and cannot be dictated by rule. If the column of the main body is deep and would take much time to form, the distance of the head of the advance-guard must be a long way in advance; but if the country is difficult to traverse and the enemy's advance can be easily retarded, the head of the advance-guard need not be so far in front as if the country was open; or, if the advance-guard is strong and can hold the enemy, it need not be so far in advance as if it were weak. Again, in thick or foggy weather, or at night, the distance in front—of the head of the advance-guard—would be reduced, as would also the breadth of front of the scouts or flanking-parties.

3378. Q. What might be considered a rough rule to be followed of ascertaining what the distance should be from the head of the advance-guard to the head of the main column? A. The distance

is to be equal to the length of the column of the main body *en route*, on the assumption that the rear of the column would then have time to form up for action. This, however, only estimates the minimum distance; in practice, it will be found that a greater depth is necessary for the advance-guard.

3379. Q. What would be the formation of an advance-guard composed of the three arms? A. The advanced party and the leading portion of the support would be cavalry. Mounted infantry and machine-guns would come next, in order that they might be ready to be pushed forward to seize bridges or defiles, and hold them until the infantry comes up. In a large advance-guard, the support should include some infantry; a small proportion of artillery would sometimes be added; a few engineers are also necessary to repair broken bridges, or assist in removing an obstacle to the advance. The pioneers of infantry would march with the vanguard for the same purpose. The reserve would be composed of all the three arms. It is headed by a small detachment of cavalry.

3380. Q. What would be the order of march of an advance-guard composed of the three arms? A. The mounted troops; then artillery, followed by machine-guns and the infantry; lastly, engineers not with the vanguard, ammunition, reserves, and ambulance.

3381. Q. What is the proper place in the advance-guard for guns? A. They should be with the reserve, being less liable to the effects of infantry fire at that point, and yet close enough to be pushed forward if necessary.

3382. Q. What should the advance-guard do upon coming in sight of a village or town? It should be halted on the main route.

3383. Q. What are the duties of the advanced party on coming to a village or town? A. Preceded by its point it moves on to reconnoitre. The point is pushed well to the front, and at the first houses outside the town an inhabitant must, if possible, be seized to give information. If any suspicion of the enemy's presence exists, the village must be turned by a portion of the advanced party, or by the support if necessary, and entered simultaneously by the front and flank.

3384. Q. What is the method of seizing a village not occupied by the enemy? A. The point must at once enter, so there may be no delay. If the enemy's scouts or patrols be in the vicinity, the entrance to the village may have been ordered to be secured on the farther side. In this case, as soon as it is perceived that the patrols are not in actual occupation of the town, he should rush with his party up the main street and seize upon the farther outlet. On the other hand, should there be no immediate necessity for this action, the commander of the point would advance into the village quietly and with due precaution.

The flank groups of the advanced party would also move up and pass through by any side roads or streets.

3385. Q. Should the point make signal to the rear that all was safe, what must the advanced party do? A. Close up rapidly to its proper distance, and as it enters the town patrols should be detached up any lateral streets or roads, always keeping up their connection with the centre.

3386. Q. What should the commander of the advanced party seize upon entering a village? A. Telegraph and post offices, with all papers found therein. If there is a railway station it should also be held, and men must be specially detailed to stop communication up and down the line. All telegraph wires are to be disconnected, or joined together and partly run to earth in order to confuse signals. The chief man of the village, or postmaster, should be seized and turned over to the commander of the vanguard on his arrival, together with the documents seized.

3387. Q. How should the entrance to a village be conducted by night? A. The operations of the leading portion of the advance-guard should be conducted as by day, but distances between the different parties of the advance-guard should be lessened. The march should be regulated so as to reach the village a little before daybreak, and the advanced parties should use care in not disturbing the occupants of outlying houses by noise which might set dogs to barking.

3388. Q. What action is taken by the advanced party, if a village is found to be occupied in any force? A. This would probably be discovered by the scouts of the point. Immediately upon this discovery the point should fall back unperceived, the leader running back with the news till he meets the commander of the advanced party. The latter communicates the information to the rear, and the officers of the vanguard and reserve coming up, the former with his support, a reconnoissance—secret or open, according to circumstances—is now made of the village. This is commonly done by a strong patrol working round to one flank, which can first reconnoitre and finally force the village from that quarter, combining with a front attack of the advance-guard.

3389. Q. Of what do the flank patrols and guards consist in small and large forces? A. In small forces, detached parties from the advance and rear guards; in large bodies, these detachments are represented by separate bodies specially provided.

3390. Q. If a flank march has to be undertaken suddenly, how is it conducted? A. The advance or rear guard nearest to the enemy will at once assume the position of flank-guard on the exposed flank; a fresh guard being detailed as soon as possible to guard the front or rear of the column.

## MARCH OF THE MAIN COLUMN.

3391. Q. What is the necessity for a correct order of march of the main column? A. In order that it may be always prepared to meet the contingency of an attack.

3392. Q. In the forward march, when the enemy is known to be near at hand, how should the various arms be disposed? A. In column of route, so as to be enabled to be brought up, with the least delay, in the order in which they would necessarily come into action.

3393. Q. When the enemy is at a distance, how may the march of the main column be conducted? A. Each arm may be given a separate route, as the rate of march in each case is different.

3394. Q. To whom is the shortest route given as a rule? A. To the infantry.

3395. Q. What is considered a day's march for a division? A. From twelve to fifteen miles; anything over twenty is considered a forced march.

3396. Q. What halts should be made during a march? A. Short halts of from 5 to 10 minutes during every hour; a halt of about 30 minutes at meal-time, or half-way. If the march is of longer duration than five hours, a long halt every two hours may be allowed with advantage.

## OUTPOSTS.

3397. Q. The army having halted after a march, what must be done at once? A. It must at once protect itself by advanced covering detachments, called outposts.

3398. Q. What is done by the advance-guard when the column halts after a march? It being in front, it naturally assumes the duties of the outposts; but if the advance-guard has been much harassed during the day's march, fresh troops must be sent from the main column for their relief; until their arrival, the advance-guard must continue to hold the ground.

3399. Q. In what way does a line of outposts compare with an advance-guard? A. The distribution of the parts corresponds generally with that of the advance-guard, and their duties have much of the same character.

3400. Q. What are the functions of the outpost line with and without a cavalry screen. A. With the screen its functions are simple and few, so long as the cavalry remain in advance; but if the cavalry be driven in, or the enemy break through the screen at any one point, the outpost line is ready for action, and the enemy should be arrested in his progress at sufficient distance from the main body to enable the latter to prepare for battle. In the event of there being no outside cavalry screen, the outpost line is the sole protection to the main body at a halt.

3401. Q. In what respect are the functions of outposts at the present time different from those of former times? A. In former times it was considered that outposts had two separate and distinct functions—one to secure the safety of the corps which established them, and the other to reconnoitre and obtain information of the enemy's movements, etc. But the second duty is not a distinct function equal in importance to the first. Outposts should not attempt to reconnoitre further than is necessary for the execution of their main duty.

3402. Q. In what manner might outposts seek information? A. By careful watching, by observing indications, and by patrolling within certain limits.

3403. Q. By whom should extended reconnaissances be made? A. By special parties, pushed forward from the main body, sometimes from the reserve of the outposts. Cavalry should be used if possible, but occasionally infantry must be employed.

3404. Q. What are the duties of outposts? A. *First*, to check the advance of an attacking enemy long enough to insure the safety of the army by enabling it to prepare for action.\* *Second*, to secure repose for the army by the assurance of immunity from surprise, and by checking reconnaissance on the part of the enemy. *Third*, to obtain such information about the enemy as may be necessary in carrying out the foregoing duties.

3405. Q. How may the infantry and cavalry be united in such duties? A. Infantry are necessary to give resistance to the advance of an enemy; cavalry are required to search for the enemy in front, and collect information of his movements, as well as for the rapid transmission of intelligence to the rear. Mounted infantry, if available, would also be included as part of the outposts, they being able to serve in the dual capacity.

3406. Q. How may artillery be employed on outpost duty? A. It could be used by being placed with the reserve, and the guns posted so as to cover a retreat of the advanced posts; or held close to a main road to proceed to any required point as the attack of the enemy developed itself.

3407. Q. How might artillery be used in more advanced position than with the reserve? A. Guns may be thrown more to the front when, without unduly risking their safety, they can be

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\* The student, by carefully reading the reports on the battle of Shiloh, can readily see how much of the disaster on that occasion might have been avoided by having proper outpost duty with patrolling parties. The author of this work knows that the first shot fired on this occasion was by a Confederate officer, leading the cavalry advance, at two men of a Union picket force, who were seated on a log playing cards. Years afterwards this was verified in his presence by the officer who fired the shot and one of the men who sat on the log.

placed so as to command ground, bridges, etc., which must be passed by the enemy in his advance.

3408. Q. How may horse artillery be used on outpost duty? A. When acting with cavalry, it may sometimes, if well supported, be pushed still further to the front, for the purpose of making the enemy develop his attack early in the day.

3409. Q. What is the relative strength of infantry and cavalry on outpost duty? A. This must be decided by circumstances. In a close country infantry is more suitable; in an open country cavalry, from its mobility, possesses the advantage of being able to cover a large extent of ground very quickly. Whenever the country is suitable, cavalry in any case undertakes patrolling duties; but if the enemy is near, infantry should be within reach to cover the retreat of cavalry, if the latter is driven back.

3410. Q. How are outposts divided? A. Into three portions. *First*, the pickets, including sentries, or vedettes, patrols, and detached posts. *Second*, the supports to the pickets. *Third*, the reserve of the outposts.

3411. Q. Of what are each of the three portions of an outpost composed? A. They should, as far as possible, consist of complete units under their own officers, and it is especially directed that pickets and their supports be furnished from the same corps.

3412. Q. What should be the greatest force employed on outpost duty? A. It should never exceed one sixth of the command, but should a larger force from necessity be temporarily employed, the extra duty should be reduced again as soon as possible.

3413. Q. When may a reserve of an outpost be dispensed with? A. When the force to be covered is small, or when the main body bivouacs in a defensive position, where it can quickly form in order of battle.\*

3414. Q. What are the two systems of outpost called? A. The *cordon system* and the *patrol system*. By the first system a line of sentries prevents any passage whatever on the part of the enemy; by the second, constant patrolling in front of the outposts prevents the passage of bodies of the enemy, even if it does not completely bar the way to individuals.

#### POSTING THE OUTPOSTS.

3415. Q. What is done preliminary to posting the outposts? A. The officer in chief command appoints an experienced officer as commander of the outposts, and to him is made known every-

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\* This was generally the case in the Army of the Potomac during the Civil War, while campaigning. Troops were massed in bivouac, and a line of pickets, with sentries thrown to the front was established. In camp, regular outpost duty was religiously performed.

thing as to the general object—all that is known of the enemy, how far the line of resistance should be in front of the force to be covered, etc. The position for the line of observation is next decided upon, as well as the strength and composition of the reserve and its location behind the line of resistance. These positions, if selected from a map, should be shown to the commanders of the various lines; after which the supports are marched off in the general direction of the ground they are to occupy. The reserve is finally marched by the commander of the outposts to the spot selected. Both these bodies should advance with great caution, preceded by scouts.

3416. Q. What are the duties of the commanders of the supports after having proceeded a sufficient distance to the front? A. They select positions for their supports, and send forward therefrom the pickets intended to cover the front.

3417. Q. What are the duties of the commanders of the pickets in establishing outposts, upon being sent forward from the supports? A. They advance to their ground with still greater care, and, halting their pickets in rear of the line of observation, they post their line of sentinels, tentatively at first, with a view to covering the front rapidly, and establishing communication at once from one flank to another of the line. The line itself can be corrected subsequently by the commander of the outposts, if necessary.

3418. Q. What is it usual for the whole of the outposts to do while being posted? A. To remain near their arms, on the alert, until the arrangements are completed.

3419. Q. If the outposts are to extend over a large front, how should the line be divided? A. Into sections, of from one to one and a half miles for infantry, and three miles for cavalry, in each section.

3420. Q. Who should be in command of a local section, and what comes under his orders? A. A field officer, and he should command the supports and pickets in his section.

3421. Q. Who, in this case, commands the reserve? A. The commander of the outposts always retains command of the reserve.

3422. Q. What must each picket furnish? A. A chain of sentries by day to watch the country in front, and to connect with neighboring pickets. They are placed in pairs or in groups, at a distance of from 100 to 400 yards from the picket.

3423. Q. Where are the reliefs stationed when sentinels are posted in pairs? A. With the picket, in order to be better protected from the weather and to obtain greater rest.

3424. Q. Where are the reliefs when posted in groups? A. The sentry is accompanied to his post by the remainder of the group forming his relief, who lie down close behind him, but in such manner as to screen themselves from the enemy.



3425. Q. What change is made in the number of sentinels at night? A. At night the sentries should always be doubled.

3426. Q. Of how many men is a group composed, and who exercises control over them? A. By day, three men; by night, six men. A non-commissioned officer is placed in charge of from one to three groups.

3427. Q. What are vedettes? A. Cavalry sentries, mounted.

3428. Q. How are vedettes posted? A. Either as double vedettes, relieved from the picket, and at a distance of about 600 yards, or in groups, which are known as Cossack posts.

3429. Q. What constitutes a Cossack post on outpost duty? A. It has only one vedette; his relief, in charge of a non-commissioned officer or the senior soldier, being posted close to him.

3430. Q. For what positions are the Cossack posts most suitable? A. For places difficult of access from the picket, or where a vedette cannot be seen from the picket or from the next posts.

3431. Q. How close to each other may the men of a double vedette post be located? A. From twenty to thirty yards apart; near enough to communicate when required, but not to encourage conversation.

3432. Q. In what manner should sentries and vedettes be governed while on post? A. They should have clearly in view the men of the posts on each side of them, and no ground in front of two adjoining posts should be unseen by the sentries of both posts. They should not, as a rule, fix bayonets by day nor on bright moonlight nights, but, as a safeguard against surprise, they should invariably do so on dark nights or in thick weather. Vedettes have their carbines drawn, loaded, and at the advance.

3433. Q. How should sentinels be placed at night, with regard to the sky-line? A. If possible they should be so placed as to bring any advancing person against the sky-line, they themselves remaining in shadow; but this cannot be done in all cases with the cordon system. A sentinel may sometimes accomplish this by lying prone, if he hears some one advancing whom he cannot see. He, however, should not await the approach in that position.

3434. Q. How are the sentinels numbered, and how often relieved? A. Those furnished by each picket are numbered continuously from the right; they should be relieved every two hours by day and every hour by night.

3435. Q. What are *connecting sentries*? A. Men used for communication between the chain of sentries or groups and their pickets, and between detached posts and the chain of sentries.

3436. Q. What is a *sentry over picket*? A. A lookout sentry, placed at the picket to watch the double sentries or the sentry connecting the picket with them to call attention to any signals they may make, or to any unusual occurrence.

3437. Q. What are *detached posts*? A. Posts to which access

from the picket is difficult, or the distance of which is beyond the limits laid down; or there is an exposed flank which it is necessary to guard. These posts should be composed of from three to twelve men, under an officer or non-commissioned officer, and form a picket on a small scale. They should be relieved every six hours. They should light no fire under any circumstances, should wear their equipments and have their rifles always beside them. If of cavalry, one half of the men should only dismount at a time, unless the enemy is known to be at a distance.

3438. Q. What is an *examining post*? A. It is located on the principal main route of approach; consists of an officer or a selected non-commissioned officer and six men, whose duty it is to examine all persons and their effects coming from the outside. Should the parties be deserters or suspected spies, they must be forwarded, without questioning, to the commander of the outpost, under charge of a guard.

3439. Q. If there be no examining post along the line, what is done regarding persons desiring to pass? A. The officer of the nearest picket will receive the report of the approach of any one to the lines.

#### PATROLS.

3440. Q. How many different patrols from the outposts are recognized, and what are they? A. *First*, visiting patrols; *second*, reconnoitring patrols; *third*, strong patrols.

3441. Q. What are visiting patrols, their functions, and how composed? A. They are sent out from each picket between reliefs, and their duties consist in keeping up the communication between the picket and its neighboring pickets, as well as with its support in rear, and with its detached parties in advance. They consist of (an officer, if necessary) usually a non-commissioned officer or an old soldier and one or two men. They test the watchfulness of the sentries, or vedettes, aid them in case of sickness or wounds, or in examining doubtful objects from a fresh point of view, and bring back their reports.

3442. Q. In visiting a chain of sentries, with whom should the patrol communicate? A. With the nearest sentry of the next picket on one flank first, and then proceeding along the front of the line of sentries, touch on the nearest sentry of the picket on the other flank.

3443. Q. What might a visiting cavalry patrol do in communicating with the line of vedettes, if the ground in front of the line was exposed? A. It might preferably move altogether in the rear of the line of vedettes.

3444. Q. When are visiting patrols especially necessary? A. In a close country and in bad weather. In an open country, with clear weather, they need not be sent out so often during the day.

3445. Q. What may take the place of a visiting patrol, if the line of sentries furnished by the picket can be observed from some vantage-point? A. A non-commissioned officer may frequently be sent to the point indicated, to observe and report on the appearance of things, and thus enable some of the daylight rounds to be dispensed with.

3446. Q. If the picket be short of men for duty, what may be employed as visiting rounds? A. The reliefs must be employed.

3447. Q. Of what do reconnoitring patrols consist, and what are their functions? A. They consist of an officer or a non-commissioned officer, and from two to seven men, according to circumstances. They are sent forward in advance, a limited distance not exceeding from half a mile to a mile for infantry, to examine ground which cannot be watched by the sentries, and to give notice of the enemy's approach.

3448. Q. To what extent may the reconnoitring patrols of cavalry be used on outpost duty? A. They may be despatched to a much greater distance than infantry; they may safely go four or five miles to the front, and if they do not touch on the enemy, they may go as far as ten miles.

3449. Q. What is meant by strong patrols? Describe them and their duties. A. They are of the same character as the reconnoitring patrols, but of larger force, and not necessarily secret. If of greater strength than a dozen men, they should be furnished from the supports or reserve. If composed of infantry, they should proceed not further than one mile beyond the line of sentries, and even then with mounted orderlies attached, to take information rapidly to the rear.

3450. Q. What is the object of strong patrols? A. Generally to obtain early information of the enemy's movements when he is at a distance, to ward off his patrols, and to prevent surprise; sometimes to engage a post, in order to ascertain the enemy's strength.

3451. Q. Why should strong patrols sent on reconnaissance duty avoid unnecessary firing? A. Because firing signifies to those in rear that the patrol has not only seen the enemy, but the enemy has seen the patrol, and is advancing. An incessant fire, kept up in retiring, intimates that the enemy is in force, and pressing the pursuit; but this signal should be abstained from, unless it is necessary to rouse the troops in rear.

3452. Q. What must the outpost line do with regard to false alarms? A. It must be most careful not to occasion false alarms, as such alarms are injurious to the morals of the army.

3453. Q. What general rule is best to follow by a patrol in retiring before the enemy, where there are no orders to the contrary? A. To retire steadily, unperceived if possible, as soon as the enemy is touched upon; but, if opportunity serves, it would

sometimes be well to capture a prisoner or two, to obtain information.

#### PICKETS.

3454. Q. How is the strength of a picket determined? A. By the number of posts for which it furnishes sentinels or vedettes, in addition to the men required for detached posts and patrols.

3455. Q. Where is the picket posted, and for what purpose? A. It is posted in rear of the line of sentinels, as centrally as possible, and on a main route or thoroughfare. It acts as a support to the sentries, vedettes, or detached parties which it furnishes.

3456. Q. What should be the position of the picket with regard to concealment? A. It should be so far concealed that the enemy can discover it only by attacking; but there should be free movement in all directions, and especially easy means of communication, both with the flanking pickets and with the supports in rear.

3457. Q. Where should sentinels and pickets be posted when stationed at bridges, defiles, etc.? A. The pickets should be on the near side, the far side being patrolled or guarded by the sentries if the distance is not too great.

3458. Q. Where should pickets avoid being posted? A. They should not be posted in a house or inclosed yard or garden; and a cavalry picket especially must take care not to occupy any position which would cramp its movements on being attacked.

3459. Q. How should pickets be posted with regard to the joining or crossing of roads? A. Those that lead from the front should be in advance of the picket, and any road passing the flank to the rear should be carefully watched.

3460. Q. If the flank of a line of pickets is not protected by impassable ground or natural obstacles, what should be done? A. The flanking picket must be thrown back; it should furnish a detached post to prevent a turning movement of the enemy, frequent patrolling being also kept up on the exposed flank.

3461. Q. Should the pickets be permitted to light fires? A. As a rule, no; but if permitted they should be carefully screened from observation, and so arranged that neither light nor smoke can betray its position: the fire, therefore, in any case, should be small, and arrangements made to smother it at a moment's warning.

3462. Q. How should cavalry pickets hold themselves in readiness for prompt action? A. By keeping the horses always saddled and bridled, with the exception of a few at a time. During the day the saddles should be shifted, so as to ease their backs.

3463. Q. What proportion of the picket should be always held ready for immediate action by day and night? A. In all cooking, feeding, eating, and watering arrangements, two thirds of a

picket of either arm should be held ready for immediate action. As many as possible should be allowed to repose during the day, but at night all should be on the alert.

3464. Q. How are the different pickets designated? A. They should be numbered from a flank by the commander of the outposts.

#### SUPPORTS.

3465. Q. Of what strength should the supports on outposts be? A. Equal to all in front of them, and one support to two or three pickets.

3466. Q. What is meant by *the line of resistance* on outpost duty? A. It is the line designated where the first important stand is to be made.

3467. Q. What portion of the outposts occupies the line of resistance? A. The supports are usually placed thereon as centrally as possible to their own group of pickets.

3468. Q. If the best line of resistance should appear to be close in rear of the best line of observation, where should the supports be? A. They may be posted immediately in rear of the pickets, or even on the same line.

#### RESERVE.

3469. Q. For what is the reserve of outposts intended? A. As a general support to the line of pickets and supports.

3470. Q. Of what should the reserve of an outpost consist? A. Generally of from one third to one half of the whole strength of the outpost. The subdivision in one case would be: one third for each of the reserve, supports, and pickets; in the other case, one half for the reserve, and one fourth each for the supports and pickets.

3471. Q. Where should the reserve of an outpost be posted? A. Out of sight of the enemy, occasionally divided into two parts, on a principal route or routes of retreat to the main body.

3472. Q. What are the functions of the reserves of outposts? A. To move to the reinforcement of the supports, if necessary, or to occupy a good defensive position for the troops in front to fall back upon if required.

3473. Q. What privileges are the men of a reserve on outpost duty allowed? A. Bivouac, rest, cook, eat, and smoke, but they should always be ready to act at the shortest notice.

#### SMALL POSTS OR GROUPS.

3474. Q. Of what use are small posts or groups of four men? A. Sometimes in establishing sentries and pickets, particularly

in close and rugged countries, great difficulty will be experienced in placing the former, so that they should be in sight of their neighboring sentries and of their pickets, and at the same time be posted so as to be easy of access from the pickets in case of need. In such cases, during the day, the line of sentries and the line of pickets which supply them may be replaced by one line of groups of four men each, furnished direct from the supports, and commanded by a corporal or an old soldier, who would be one of the four men.

3475. Q. In what manner should groups on outpost perform their duties? A. The three men of the party would furnish the relief for the sentry, who would be posted in the best lookout position from 10 to 50 yards to the front. The men not on sentry would remain with the commander, well-hidden from view, keeping constant watch on their sentry or lookout man. One man might occasionally be sent to patrol to the next post if desirable, but patrolling is not a part of the duty. The sentry should be relieved every hour, the post every six hours.

#### THE OUTPOST LINE AT NIGHT.

3476. Q. What disposition is made of the outpost at night? A. A change of position from that of the day will usually become necessary. This should be carefully arranged before dark, and put into execution just as the light is failing, so as not to be observed by the enemy. Bridges, main routes, and obligatory points of passage should be occupied by the pickets, the supports or portions of them being pushed close up to the pickets, and then patrolling should be frequent between the pickets, the advanced sentries being used only on the avenues of approach.

3477. Q. If the outposts consist of a mixed force, what duties devolve upon the cavalry at night? A. It should continue its patrols on the main routes, but its vedettes should undergo a thorough change of position. Cavalry pickets which have been in open ground must at dark be placed upon the roads, double vedettes being advanced a short distance immediately in front, up each approach.

3478. Q. Upon which portion of the outpost at night must be placed the principal reliance? A. Upon the cavalry patrols, which are kept constantly in motion.

3479. Q. What arrangements should be made at night, with a view to holding an important position which has been occupied by the outposts during the day? A. A number of standing patrols, or patrolling posts of four men each, may be pushed forward at dusk, traversing all roads, paths, or possible approaches. The pickets by this would be weakened, and therefore the supports must close up on them. If the whole of the support has

reinforced the pickets, a portion of the reserve must be moved up to take the place of the support at its former post.

3480. Q. What should be done by the patrolling posts at day-break? A. Make a reconnoissance well to the front before rejoining their pickets, and obtain any possible information of the enemy.

#### DUTIES OF THE COMMANDER OF AN INFANTRY PICKET.

3481. Q. What should the commander of an infantry picket provide himself with? A. A field-glass, a compass, a map, a watch, a note-book, a pencil, and some sketching materials of simple character.

3482. Q. From whom does the commander of an infantry picket receive his instructions? A. From the commander of the outposts or from the field-officer of his section, according to circumstances, and he must note them down.

3483. Q. What should the picket commander's orders indicate? A. The hour at which he is to mount picket, the ground he is to watch, the approximate position of the picket with those of neighboring pickets and supports, the amount of resistance the picket is to make if attacked in superior force, and in the latter case the general dispositions the officer is to make, together with his line of retreat.

3484. Q. What must the picket commander also ascertain? A. Where he is to send his reports, from whence he is to be supplied with camp requisites or provisions, and where the picket is to be posted at night, with the night positions of neighboring pickets and supports.

3485. Q. What should the commander of a picket do before starting for his post? A. Make an inspection and rough nominal list of his men, examining their arms, ammunition, and rations. He should see that each non-commissioned officer has a pencil and paper, or note-book, with him.

3486. Q. Having passed the line of supports, how should the picket advance? A. With great caution, moving with scouts out in front, and flankers if necessary. The commander should note any position which may be useful to him for making a stand in retreat.

3487. Q. How does the picket obtain position? A. The picket is halted a little in rear of the intended line of observation, and the officer proceeds with an extended patrol to work up to the ground. He is followed by a party, under a non-commissioned officer, to furnish the first relief of sentries, which, as it advances, opens out by files so as to cover approximately, in extended order, the whole of the ground allotted to the picket to guard. On arriving at the line of observation, if nothing has been seen of the enemy, the officer halts, permitting the patrollers

to go on to examine any suspicious ground within short rifle-range. As the extended party of sentries comes up to him, the officer posts them by files, tentatively at first, wherever there appears the best lookout.

3488. Q. After the picket commander posts his line of observation, what must he do? A. Communicate with the pickets to his right and left, passing along his double line of sentries in doing so, and correcting their positions, reducing the number of posts, if possible, or replacing some by groups with a single sentry.

3489. Q. What should the picket commander see that the sentries understand? A. That they are able to answer three questions: 1. What is known of the enemy? 2. Where are their own pickets—detached or advanced posts, if any—and the other sentries? 3. Where do the roads in sight lead to?

3490. Q. After having seen that the sentries understand their duties, what will the picket commander do? A. Return to his picket, and, if necessary, move it to a more suitable position. He then posts a lookout sentry, and sends report of his dispositions to the outpost commander.

3491. Q. What should the picket commander do with the information secured through his sentries and patrols? A. He should forward it at once to the commander of the outposts. Mutual information of the enemy's movements should be given to one another by pickets and supports.

3492. Q. How should an infantry picket commander receive a vigorous attack by the enemy during the day? A. In the absence of other instructions, as a general rule, he ought at once to reinforce his line of sentries so as to cover his front with an extended firing-line, which should retire slowly upon the general line of resistance or supports, taking every advantage of the ground. On nearing the supports, the picket commander should direct his retreat upon one flank of his own support, so as not to mask its fire, and then co-operate with it in defense of the whole line.

3493. Q. How will the picket commander be governed if the stand is to be made at the line of pickets? A. In this event, the picket commander would have probably received instructions to strengthen his post by every means at his disposal, and would continue to hold his ground on the enemy advancing, his sentries falling back upon either flank of the pickets. The support would now be brought up to the assistance of the pickets, the whole retiring in one line as soon as the position becomes untenable, or the flanks commence to be turned.

3494. Q. When will the commander of an infantry picket barricade the roads? A. At night, leaving a passage clear for patrols in front to get through in returning.



## DETAILS OF COMMANDER OF CAVALRY PICKET.

3495. Q. What are the instructions for a commander of a cavalry picket? A. He receives and notes his instructions, the same as the commander of an infantry picket; but in addition to inspecting his men, he examines carefully the horses of his picket, and sees that the forage they carry is sufficient, and ascertains whence he is to receive such further supply as may be necessary.

3496. Q. Describe the details of marching a cavalry picket to its post? A. He marches his party, covered by advanced and flanking patrols, to about the centre of the ground he is ordered to take up, halts a little in rear of the position, tells off his picket, and sends out a reconnoitring patrol to the front, as well as a visiting patrol to establish communication with adjoining pickets.

3497. Q. How should a cavalry picket be divided? A. About two thirds for vedette duties and one third for patrols.

3498. Q. In what manner should patrols and vedettes be selected? A. The keenest-sighted men should be selected for vedettes, and the best mounted and most intelligent for patrols.

3499. Q. Describe the method of posting vedettes? A. The vedettes, after being selected, are divided into three reliefs; the first relief and a non-commissioned officer, with one or two orderlies, move out of the ranks and accompany the officer. The picket remains mounted under the second in command, the advanced and flanking patrols being on the lookout. The officer endeavors to get on some height from which he can view the ground, to decide if Cossack posts or double vedettes will be the most suitable. The central post is first placed, and then the flank vedettes as quickly as possible, defects in their positions being subsequently corrected.

3500. Q. When are the advanced and flanking patrols withdrawn? A. As soon as the vedettes are posted.

3501. Q. What must the commander of a cavalry picket do, upon rejoining his picket, after posting the vedettes? A. Select a proper station for the picket, and allow the men to dismount, unless the enemy is close at hand, when it may be advisable to permit only half to dismount at a time. He then places a lookout, or picket sentry, and if necessary a mounted sentry to connect the latter with the vedette posts.

3502. Q. What report should the commander of a cavalry picket send to the rear, after posting his picket? A. When the visiting patrol sent out has returned, a report to the rear is made, showing how many vedettes have been posted, where they stand, the position of the picket and any information brought in by the patrol. If possible, a rough sketch should accompany the report.

3503. Q. Of how many men will the reconnoitring patrols con-

sist. How many should there be at a cavalry picket post, and why? A. There should be three patrols of three men each, so that one may be out, one ready to go, and the other resting.

3504. Q. What is the duty of a reconnoitring cavalry patrol? A. To examine every path or road leading towards the enemy, and to ascertain whether they and the adjoining ground are passable, or whether there are obstructions anywhere; also, the paths leading to the flanks and to the supports must be further examined. All inhabited places in the immediate vicinity must be specially visited.

3505. Q. When the first reconnoitring patrol is sent out, what will the commander of the picket do? A. He will again ride along the line of his vedettes, accompanied by an orderly, and carefully examine the ground about each of the posts, directing the men by what paths to retire if they should have to fall back; and should determine then and there what he would do if the picket was suddenly attacked during the day.

3506. Q. What general instructions should be observed regarding the fighting of a cavalry picket? A. In general a cavalry picket should not fight, otherwise than to prevent the passage of small parties or reconnoiters of the enemy through the outpost line. Should the enemy appear weak and the ground favorable, the picket might advance to assist the vedettes, and make short, rapid attacks upon the enemy's patrols; but if the enemy appear in force beyond that of a small patrol, information is at once dispatched to the support, and the picket and vedettes fall back slowly. If, however, the enemy appears to be rapidly advancing upon the support, the picket, should the ground admit of action, must not hesitate to attack, even to sacrificing itself, to prevent the support being surprised.

3507. Q. In what manner should a cavalry picket retire? A. It must take care not to interfere with the offensive forward movement of the support, but keep off to one flank.

3508. Q. What is done if the enemy be repulsed by the outposts? A. The picket commander must send out pursuing patrols to report where he halts, and these patrols must be careful not to fall into ambush, and must go no farther than the distance indicated to them. In the mean time the picket resumes its former position, but its ground should be changed shortly afterwards.

3509. Q. What should the commander of a cavalry picket do in case of a night attack on him? A. He should first endeavor, if he has the time, to find out by patrols the strength of the enemy, so that the main body might not be forced to move. His main thoroughfare might be temporarily barricaded, and after having secured a safe passage for his patrols and vedettes, a few men might thus check the enemy's advance, while the picket retires.

## DISTANCE OF THE OUTPOSTS FROM THE MAIN ARMY.

3510. Q. How is the distance for the reserve of the outposts from the main army determined? A. By the distance that the line of resistance or supports should be advanced. All other distances, whether to the front or rear, should be relative to this line; but it is evident that the necessary obstruction to this advance must take place outside the zone of effective artillery fire, whatever this may be, with the weapons in use. An outpost, however, must under no circumstances be advanced so far to the front that it cannot be securely retired without undue loss.

## RECONNOITRING.

[Under this head candidates may elect to be examined in Wagner.]

## INFORMATION BY MEANS OF RECONNOISSANCE.

3511. Q. What is understood by the term reconnoitring, and under what heads may reconnaissances be classed? A. Reconnoitring is the act of smaller or larger forces advancing to the front or flanks of an army for the purpose of observing the enemy or the country. Reconnaissances are classed under the heads: 1st. Reconnaissance in force; 2d. Special reconnaissance; 3d. Ordinary reconnoitring or patrolling.

3512. Q. Explain what is meant by a reconnaissance in force? A. It is an openly offensive movement of the three arms ordered by the general-in-chief, to be put into execution for the purpose of ascertaining the enemy's strength, and if possible his dispositions. It is commonly the precursor to a general action.

3513. Q. How, in general terms, should a reconnaissance in force be conducted? A. The enemy should be threatened in such manner as to lead him to suppose that a real attack is intended, and to force him to disclose his strength and position. During the advance reconnoitring officers should be well to the front, seizing upon every point of vantage for a good lookout, noting the details of the enemy's position, marking where his troops and guns are placed, and estimating distances.

3514. Q. For what object must great care be taken by a reconnaissance in force? A. Care must be taken in order that the movement does not lead to a general action, for which the force is not prepared.

3515. Q. What time in the day is best suited for reconnaissances and why? A. Late in the day: even if it should be difficult to withdraw, darkness will enable the commander to put a stop to the fight.

3516. Q. For what purposes are special reconnaissances made?

A. they are made with a specific object in view—to reconnoiter a position, or to attack a post in order to force the enemy to disclose his intentions. It is usually strong, but not of a strength beyond what is absolutely deemed requisite for the purpose, and it should fall back the moment the object in view is attained.

3517. Q. What is included under the head of reconnoitring parties or patrols? A. All small reconnaissances, from the exploring patrol of a corporal and file of men to the staff officers, party of cavalry, with infantry in support.

#### INFANTRY PATROLS.

3518. Q. Of what are infantry patrols composed? A. They should be composed of picked men, instead of the first files on the right or left of a company, and only those who have an aptitude for the duty, and who have been trained therein.

3519. Q. What qualification should a good infantry patroller possess? A. His hearing and vision should be perfect, and he should possess a readiness of resource under difficulties; be quick at understanding and carrying out his orders, and be familiar with marching by the points of the compass. The leader should be able to read his orders and to write a clear and correct report.

3520. Q. In what manner should an infantry patrol of three men move? A. They should move one behind the other in single file, the commander in the centre, about 50 yards from the leader, when on a narrow road or path. If the road be sufficiently wide, or through fields, one man at the head as point of the patrol, the others following at 50 yards' distance. As the ground opens out, the commander and the second man may be more or less apart. In open country, if one flank is dangerous, the second man is more in that direction; if the two flanks are dangerous, the two men of the patrol may march abreast of each other, 100 yards apart, followed by the commander 50 yards in rear.

3521. Q. In what manner should an infantry patrol of four men march? A. They should march in a similar manner to that prescribed for three men—a leader or point 50 yards at least in advance of the others, who should either remain with the commander or be detached to each flank, according to the nature of the route. In open country, a more extended front, up to 200 yards from flanker, and even a greater distance from the point to the commander may be assumed.

3522. Q. What is the object of having the men of patrolling parties separated? A. To enable the men, according as the ground permits, to see, mutually support, and assist one another, without bringing them so close together that they could all be cut off or taken at once in the event of a surprise.

3523. Q. What is a stealthy or sneaking patrol? A. One which should move by stealth along hedges and walls, by hollow roads

and ravines, or water-course lines; disappear in woods and work through to the far borders on the enemy's side, whence, concealed from view, the men may observe all that passes.

3524. Q. What should be done with a stealthy patrol before starting? A. The men should be led to high ground, in order to observe the country they are to explore, and to have pointed out to them any landmarks or remarkable objects already noticed.

3525. Q. What should be the line of conduct of a stealthy patrol? A. The men must neither talk nor smoke; they must be careful that their arms and accoutrements do not rattle or clash, and abstain from noise in advancing; walk on soft in preference to hard ground, and make frequent halts to observe their direction, both for advance and retreat.

3526. Q. What precautions are imposed on the stealthy patrol as to its retirement? A. The men must note any peculiarities of ground which might be useful to them in falling back; and if necessary, in order to be certain of finding their road again on return, they must mark it out by broken branches, by scores on the bark of trees, by straw fastened to trees or fences, or even by a heap of stones.

3527. Q. What is the mission of a stealthy patrol? A. It is intended to observe the enemy and to avoid fighting, unless it be necessary to force an opposing patrol; in which case, should the enemy's patrol or party be repulsed, the stealthy patrol must not pursue, unless it be necessary to gain important information.

3528. Q. What should a stealthy patrol do, if suddenly attacked in force by the enemy? A. To disperse, and the men make their way separately to a fixed place of rendezvous chosen by the commander on the march out.

3529. Q. What precautions are enjoined on stealthy patrols while advancing? A. They should never as a body enter any building, nor halt in its neighborhood longer than to make inquiries; should two friendly patrols meet, it must be without noise; they should interchange news before moving on. On nearing the enemy one of the party should now and then place his ear to the ground and listen, and if suspicious sounds be heard the men must hide; should they perceive the enemy on the march, they must not fire nor show themselves, but seek to discover his force and design; if it is possible for one man to run instantly to the rear without being seen, he should be dispatched with the news of the enemy's presence.

3530. Q. What precautions must be observed by stealthy patrols at night, if they suddenly come across a sentry or party of the enemy? A. They should halt and remain motionless without replying—in which case the enemy may think he is mistaken, and the patrol may retire without detection. If the patrol is clearly discovered and one of the men is able to speak the ene-

my's language, time may be afforded for retreat, or an approach gained, so as to carry him off before he can fire.

3531. Q. What should a stealthy patrol do, if it unexpectedly encounters the enemy in force, and be unable to retire to give warning? A. It must signal the fact by firing and falling back upon the route by which it advanced.

3532. Q. Of what advantage is a patrol of five men? A. It attains its first complete and perfect organization as a marching body, having an advance-guard, flankers, and a rear-guard, the commander representing the main body.

3533. Q. What advantages are gained by increasing the strength of the patrol? A. The formation approaches nearer in all details to that of a column of troops en route; the distances and intervals are extended, but they are always limited to the extent that the power of directing the whole is not removed from the commander of the patrol.

#### MOVEMENTS OF A SMALL INFANTRY PATROL.

3534. Q. What difficulties are met with in patrolling a close country, and how should the men move in consequence? A. The patroller is exposed to the chance of an enemy being behind every obstacle he encounters. He must therefore move with the greatest caution from one point to another, where he could halt and carefully reconnoitre before advancing to another. These points should be close to one another, and the movement from one to the other be rapid if the enemy is near.

3535. Q. What is the difficulty which besets a patrol in moving through an open country, and what is the line of conduct? A. The difficulty of concealment becoming greater, the patroller must be still more cautious than in a close country, to avoid detection. He should take advantage of the smallest extent of cover, work up the roads close to the fences, if there are any—even in a ditch by the roadside.

3536. Q. What should a patrol do if a column be following in rear? A. Care must be taken that its march is in no way retarded by the patrol. The reconnaissance must not only be effected with the requisite exactness, but with rapidity, as time becomes an important element.

3537. Q. What is the duty of a patrol in encountering lateral roads? A. When it comes to a branch road, two men, one in advance of the other, should push rapidly up it till they come to the first turn in its general direction. If nothing is in sight they return; but, if they should discover anything suspicious, one man runs back rapidly to stop the patrol's advance on the main road, while the other, hidden at the turn of the branch-road, continues to reconnoitre.

3538. Q. What will patrols do when crossing fields? A. The

hedges, ditches, banks, and the least accident of ground must be utilized to its fullest extent. If the cover is parallel to the general route, the men must keep it between themselves and the probable quarter in which the enemy may be; if it is perpendicular to the advance, they must halt behind each obstacle to pull themselves together, look out for a moment, then rapidly clear it, and push on to the next spot with all speed.

3539. Q. What will patrols do when ascending hills, knolls, or high folds of ground? A. If there are sufficient men, one or more should be sent around each flank at the base, while the leading man advances up the slope, lowers his position as he arrives near the top, and, when the crest is gained, drops flat on the ground, and looks carefully over the summit. If there are only three or four men in the patrol, one advances to the crest, followed by the second at a little distance, while the other man or men follow farther to the rear.

3540. Q. How should the patrol pass a defile? A. If the sides or height bordering the defile admit of examination without too much loss of time, they should be reconnoitred by flankers before the leading man enters. If the examination cannot be made, first one man leads off in a steady double time, looking out sharp to the right and left as well as front; then another man follows at a short distance in the same way—that is, if the defile is not too long; if it is, the pace must be moderated. The third man remains at the entrance as long as he can see the others,—then follows them.

3541. Q. What should a patrol do before crossing a bridge? A. The bridge should be carefully examined, to ascertain if the enemy has tampered with it. Should the bridge appear safe, the patrol would pass over it in double time.

3542. Q. What should a patrol do at the passage of a stream or ford? A. If it is a narrow passage, the patrol must restrict its front, and as soon as the crossing is effected the flankers must spread out again. If a column is following in rear and a water-course stops the advance, and no information as to fords can be obtained, the stream should be sounded. If the patrol be alone, a detour may be made, unless the stream can be crossed by a ready expedient.

3543. Q. How should a patrol search small woods or groves? A. The leading man goes alongside the edge of the wood, followed a little in rear by the commander, who works along the border, just inside of it, so as to see well into the wood without losing sight of the man outside. The third man follows well to the rear, outside the wood. If the preliminary examination of the border reveals no sign of occupation, the two men in front cautiously enter the wood, go through it, and look out from the opposite side, keeping concealed. The third man follows them

up round the outside edge, and joins when the others emerge on the farther side.

3544. Q. What should be done by a patrol searching extensive woods? A. A small patrol must content itself with an imperfect examination. If not intersected with roads, the borders alone can be explored. Should there be a road through the wood, one man would reconnoitre up to the first turn, while the others examine the borders on each side near the entrance. If nothing is discovered, one man leads on one side of the road, looking out well to his front, and also through the wood to his flank; the next man following at a little distance on the other side, keeping an eye on the leading man, also looking sharply through the trees on his own side. The third man follows, keeping the other two just in sight.

3545. Q. How should a patrol examine houses, farms, etc.? A. If the patrol is small, it should be reconnoitred from a little distance; and if the inspection be satisfactory, the commander and another of the party advance resolutely to the front entrance, the third man remaining hidden about 50 yards off, within sight of the door. If the party be sufficiently large, the back and front entrance should be simultaneously visited. If the owner comes out, the commander obtains what information he can. If the summons is disregarded, one of the men enters and brings some one out. Should all appear so far safe, the house and enclosure is thoroughly searched for an enemy by two of the party, always leaving a guard outside. Should the searchers not appear after a limited time, or if they do not answer when called upon, the man outside will fire a signal-shot. If this meets with no response, information must be taken or sent to the rear by one man; the others, if there are any, remaining in secret observation until reinforced.

3546. Q. How should small villages or hamlets be examined by a patrol? A. A large village or town should never be entered by a small patrol. They must merely be reconnoitred from favorable ground. The patrol may enter a small village after due precautions, first seizing, if possible, an inhabitant on the outskirts. Children or youths should be taken in preference, as they are liable to reveal the truth. Should all appear safe, the patrol will enter the hamlet. The two leading men march one behind the other, the commander of the party second, on one side of the road or street, looking up at the houses opposite. The third man remains at the entrance, unless the road turns, when he must follow to keep the others in sight. Having gone through the village, two of the party return to obtain information, one or more being always outside. These should be posted in some good position for observation, or to get away if the first man is seized by the enemy concealed in one of the houses.

3547. Q. How should a patrol act when approaching habita-



tions at night? A. The men must conceal themselves close by and listen for a few minutes. Should no unusual noise betray the enemy's presence, the two leading men must creep up to the nearest doors to listen, and endeavor to look in any windows where a light is to be seen. If information cannot be obtained by these means, an inhabitant must be seized. If there is a village watchman, he should, if possible, be taken by surprise. This is especially important if other troops are following in rear.

#### DUTIES OF THE COMMANDER OF A SMALL INFANTRY PATROL.

3548. Q. What should the commander of a small infantry patrol do upon receiving his instructions? A. He should, first of all, ascertain to his entire satisfaction that he clearly understands them, committing them to paper if verbal. If there is anything not quite plain, he must ask for further explanation and note it down. If he does not know the ground he is to patrol, he must request information about it.

3549. Q. What must the commander of a small infantry patrol do before marching off? A. Carefully inspect his party, and see that the ammunition is correct, that the rifles are in good order, and that no man has a sore foot or a boot or stocking likely to cause one on the march. He takes care that the accoutrements are so arranged as not to rattle, and that anything glittering about the head-dress is removed. He must ascertain that the men perfectly understand what signals are to be used, and should put them through those adopted for use between themselves. He should read his orders to the men, and explain to them the object of the patrol and where the enemy is supposed to be; he should, moreover, inform them of their general route for advancing and for returning.

3550. Q. What should the commander of a patrol be provided with? A. Pencil, paper, a watch, and a pocket compass.

#### CAVALRY PATROLS.

3551. Q. How are cavalry patrols worked? A. On very much the same general principles which guide those of infantry, but the distances over which they can pass, and the intervals of frontage in their formations, are of course much greater. The system of detaching groups of scouts from a patrol, if of sufficient strength to furnish them, is moreover peculiar to the cavalry service.

3552. Q. Should a cavalry patrol fight? A. A reconnoitring patrol should in general avoid it; but there will arise circumstances at times to occasion an action. It should only be resorted to where a line of patrols covering their front with scouts are required to hold their position in advance of other troops, or to

drive in the enemy's line of scouts to prevent his attempts at reconnaissance. In such instances, however, special orders would be issued. Indeed, a patrol must be governed by the orders it receives, and these orders should embrace all information in that respect.

3553. Q. What should a cavalry patrol do to give alarm? A. If within the hearing of the main body of troops, the same rules for firing to give an alarm hold good for cavalry as regards infantry.

3554. Q. What is done if a cavalry patrol appears to be cut off? A. The commander may disperse it. If there is no necessity for immediate report to the outposts it may sometimes be allowable to retreat in the opposite direction, and return by a detour under cover of darkness.

3555. Q. When does the real work of cavalry patrolling begin? A. Only when the enemy is first touched upon, the results to be obtained therefrom assume their highest value and importance from this time.

3556. Q. What responsibility has the commander of a small cavalry patrol as compared with infantry? A. He has much the same: he makes his inspection before starting and pays particular attention to his horses and the shoeing of them, reads his orders to his men, so that any one of them could continue the patrol in case he was cut off or met with other accident.

3557. Q. What is the formation for a small cavalry patrol? A. If it is of a secret nature, more rigid formations must be preserved in the advance, and the same care and caution exhibited in reconnoitring.

3558. Q. What precautions must be taken with a cavalry patrol which are not necessary with infantry? A. The commander must never permit his men to enter upon ground that is unsuited for the movement of horses, or where insurmountable obstacles bear on his line of retreat. A man mounted should therefore not be permitted to enter an enclosure that has not a free passage through it, unless a comrade remains at the entrance to preserve for him his means of retreat. Nor should he go inside a wood, unless it is thinly planted, so as to allow free passage in all directions.

3559. Q. Why is a strongly developed sense of locality more necessary in the commander of a cavalry than an infantry patrol? A. Because the distances over which the former has to travel are greater. He should, therefore, have a good eye for ground, be able to read a map, and find his way by it, and understand marching by the compass.

3560. Q. What are among the most important of the duties of the commander of a cavalry patrol regarding information to be obtained? A. Should he not touch upon the enemy, he must make the most diligent inquiries wherever he can, as to when

they were seen, in what strength, and with what kind of troops ; how long they halted, and in what condition they were at the time ; what they did while they were halted ; what road they took on leaving ; whether they took guides with them, and if so, whether they have returned.

3561. Q. What must the commander of a cavalry patrol do regarding his main route ? A. He must select it and adhere to it, should his patrol be strong enough to admit sending out detached men or scouts ; but he must take care that he does not uselessly fritter away his men. He must see that such scouts distinctly understand how they are to keep up their touch with him, and where they are to rejoin him.

3562. Q. What should be done when it becomes necessary for a cavalry patrol to halt for the purpose of feeding and watering the animals ? A. A lonely and isolated spot must be selected, where a lookout man can easily guard against surprise. The halt must never be made near inhabited places, least of all in the immediate vicinity of an inn or tavern. In no case must the men be separated from their horses.

3563. Q. Upon what must a cavalry patrol rely at night ? A. More upon its ears than its eyes ; the commander should therefore often halt for the purpose of listening, one man occasionally dismounting and placing his ear to the ground. Horses themselves are an assistance at night in giving the earliest notice of anything unusual ; therefore great attention should be paid to their actions. The vision and hearing of horses is much superior to that of men.

#### SCREENING AND RECONNOITRING DUTIES OF CAVALRY IN ADVANCE OF THE ARMY.

3564. Q. How are the elementary details of a screening force in advance of an army conducted with cavalry ? A. In accordance with the principles prescribed under the head of patrols.

3565. Q. What is done by a screening or reconnoitring force of cavalry when the enemy is at a distance and his movements are unknown ? A. He must be constantly feared, never lost sight of, and must be watched in such manner as to observe his movements closely with a view of estimating his designs ; and at the same time to prevent his attempts at reconnaissance with like intentions.

3566. Q. What constitutes a fatal mistake that is too often made by cavalry when in advance of an army ? A. In supposing that it is sufficient to reconnoitre the enemy and return with a report, or even to reconnoitre in a certain direction and report that no enemy is seen. It is not only necessary to find the enemy, but, when found, to keep him under constant observation.

3567. Q. What course should be pursued by cavalry in advance of an army to find the enemy and keep him under observation ?

A. Detached bodies should be advanced to the front, interposing between their own troops and the enemy a veil or screen, behind which there is immunity from surprise, and in the extreme front of which feelers or reconnoiters are actively employed, collecting intelligence for transmission to the rear.

3568. Q. By whom should the screening duties of an army be performed? A. By either the *divisional cavalry* or the *cavalry division* according as the operators are of a large or small scale.

3569. Q. What is the difference between divisional cavalry and cavalry division? A. The former is the cavalry attached to an infantry division; the latter is the division of cavalry, which is an independent tactical body, having relations to the whole army of a similar nature to those borne by the divisional cavalry to its own division.

3570. Q. In what case does the divisional cavalry perform screening and reconnoitring duty, and how is its work conducted? A. If several divisions were acting together, the cavalry of each would cover the immediate head of its own column on the march, reconnoitre the country to its front and flanks, and link the column to others, just as in action it would fight on the flanks of its own division, join in its success, or help to cover its retreat.

3571. Q. In what case does the cavalry division perform screening and reconnoitring duty, and how is its work conducted? A. It furnishes the advance cavalry far to the front when several columns are moving forward in combination, the divisional cavalry being answerable for the scouting in the immediate vicinity of the columns. A force of considerable strength is usually employed on this service. The principle adopted is that of retaining a support in rear, from which smaller parties are detached to the front and to the flanks; these parties in their turn sending out still smaller fractions, until the whole assumes the form of an open fan, upon the outer edge of which the patrols are reduced to a strength of some eight or ten men, which in their turn may be covered in extreme advance by groups of scouts of two or three men together. The squadrons detached to the front are called *contact* squadrons, and the patrols they send out are commanded by officers or non-commissioned officers.

3572. Q. Describe how a regiment of cavalry might be employed in screening an army. A. It may be sent out to a distance of from ten miles to a one or two days' march in advance of the force it is to cover. One squadron moves still farther to the front, one to each flank, while the remainder acts as a support to the others. Each of the contact squadrons sends out patrols to its own front and flank, according to the nature of the ground and supposed position of the enemy. The rest of the squadron remains in each case in rear, moving along a central route. The patrols in their turn detach advance scouts, so that every part of

the ground may be thoroughly examined. The distance to which the contact squadrons should proceed from the support, and also the intervals to be preserved by the squadrons in advance, must depend upon the nature of the country and probable position of the enemy.

3573. Q. When the screen is formed by a division or brigade of cavalry, how much front should be covered? A. From ten to twelve miles against civilized troops; but this depends upon the ground, the strength, and proximity of the enemy.

3574. Q. If a brigade of cavalry be acting alone as a screen for an army, what would be a possible formation? A. As a rule, in this case a horse-battery would be attached to it for duty. The exact formation must be left to the commander; but, a possible disposition would be to let two regiments furnish the necessary contact squadrons, while the remainder of the brigade, with the guns, would follow as the main body.

3575. Q. In the event of a brigade acting independently as a screen, how should the contact squadrons move? A. In a close or cultivated country, each would move on a separate route, an immediate support following the centre squadron of each regiment, and the number of contact squadrons would depend on the number of main roads available within the limits of the front taken up. In an open country, half the number of contact squadrons might cover the same ground; the remaining squadron or squadrons in each advance regiment being kept in hand by the commanders, in a central position as regards their own contact squadrons, to act as a local support.

3576. Q. Should a brigade of cavalry engaged in screening duty avoid fighting? A. Yes, unless the enemy's screen cannot be otherwise pierced, or with a view to establish a moral superiority, or to prevent the enemy breaking through the screening force.

3577. Q. What should a screening force of cavalry provide for its rear? A. A rear-guard must be provided by the rear regiment to follow the main body.

#### CONNECTING POSTS.

3578. Q. Explain the necessity for communication between the reconnoitring parties in front and others in rear. A. It is needful that a detached patrol should be in a position to receive orders from the rear as quickly as possible; hence arises the necessity for connecting posts when reconnoissance is being carried on at some distance in advance of the main body.

3579. Q. How should connecting posts be established by an advanced body on reconnoissance? A. They should be placed on the main routes, generally at positions which can be easily found, such as bridges, or remarkable or well-known buildings, and they

are established by each detached party as it proceeds to the front, about five miles apart; but, if men can be spared, this distance may be reduced with advantage to two or three miles.

3580. Q. What force constitutes the best strength for connecting posts? A. A non-commissioned officer and six men, but never less than three, one of whom must always be ready to mount at an instant's warning whenever a messenger is seen approaching, for the purpose of carrying on the despatch to the next post.

3581. Q. What should the messenger who takes a despatch to a connecting post do after delivering the same? A. After a short rest he should return to the point from which he started, unless he has different orders, taking with him any information for his party.

3582. Q. What should be written on the outside of a message sent by an orderly to a connecting post? A. The pace at which he should ride, and the exact place and hour of the despatch.

#### COMMUNICATING POSTS AND PATROLS.

3583. Q. For what purpose are *communicating* posts and patrols? A. They are intended to facilitate the lateral communications of advanced squadrons during their operations, or of parallel columns on the march.

3584. Q. Of what strength should communicating posts or patrols be, where are they placed, and how do they operate? A. They consist of three men, one of whom is always ready to mount. They are placed at points distinctly shown on the map between the routes to be taken by the advancing troops. They ride across from one column to the other, and keep up communication in this manner.

#### STRONG RECONNOITRING PARTIES.

3585. Q. From whence would a strong reconnoitring party be detached? A. Either from the main body or from the reserve of the advanced covering detachments; that is, from the reserve of the advance-guard on the march or from the reserve of the out-posts at the halt.

3586. Q. What instructions should the commander of a strong reconnoitring party receive, and what in a general way would be the character of those instructions? A. He should receive the most precise instructions as to the object to be effected; for instance, to search for the position to be taken up by the enemy and to ascertain the numbers of his troops by such observations as he can make without disclosing his own proximity; or, he may be directed to feel for the enemy in a particular quarter until he strikes him; or he might be directed to report on the resources of

the country, the facilities and obstacles it presents for advance, and the general lines of communication.

3587. Q. To what extent may strong reconnoitring parties push their reconnaissance, and by whom are they ordered out? A. The reconnaissance may be pushed far beyond the zone of the smaller reconnoitring patrols. They are generally ordered out by the general commanding.

3588. Q. How may infantry and cavalry be combined in a strong reconnoitring party? A. In a varied country, infantry is joined to cavalry as its support. The infantry would accompany the cavalry to certain points, past which the horse must fall back in retiring. These points the infantry would hold to secure the retreat of the cavalry, which latter would then advance rapidly to the front to complete the reconnaissance. The cavalry, in its turn, would cover the retreat of the infantry across any open ground.

3589. Q. How might mounted infantry, with machine-guns, be employed on reconnoitring duty? A. If they were available, they could take the place of other infantry as being more mobile, in cases where the presence of this arm is desired. The addition of such troops gives to reconnoitring parties of this kind a strength and power of resistance which cavalry can never attain by itself.

3590. Q. When cavalry and infantry are acting together on reconnoitring duty, what should be the relative position of the two arms? A. The cavalry should be well to the front in the advance, so long as the ground permits. The infantry in rear takes up successive positions favorable for defense, as it advances, so that if at any moment the cavalry is driven back, it will be protected in its retreat by the infantry. In the return march the infantry takes the lead, unless hard pressed in a close country, when the cavalry is sent on in front.

#### ATTACK AND DEFENSE OF INFANTRY.

3591. Q. What is the order in which modern infantry must fight? A. In dispersed order, when opposed to the fire of modern artillery and small arms.

3592. Q. What qualities of infantry are more necessary now than ever before, and why so? A. Precision and steadiness of execution are more than ever a necessity on account of the dispersion and isolation of individuals in the extended line and of the substitution of groups or company columns, under many separate leaders, for the battalion or brigade columns formerly employed.

3593. Q. In what is the difference of the military training of the soldier now and formerly? A. The steady work of the drill-sergeant is now more of a necessity than formerly to the infantry soldier. His exercises in musketry, which teach him to use his

weapon with skill and to the best advantage, are also indispensably necessary.

3594. Q. Where should the education of the infantry soldier for combat commence? A. Where the instruction afforded by the drill-ground and rifle-range ends.

3595. Q. What is the duty of the company officer in connection with the instruction of an infantry soldier for combat? A. To exercise the drilled soldier in all the minutest details of the probable phases of attack and defense.

3596. Q. What should be the individual instruction of an infantry soldier to render him perfect? A. That which accustoms him not only to act in group or company, but even alone and unsupported, when occasion demands it.

3597. Q. What is the general object of all fighting? A. So far as the infantry soldier is concerned, is either to drive the enemy from a position, in order to occupy it himself, or to prevent the enemy from seizing a position which he, the soldier, already occupies.

3598. Q. What constitutes the earliest means for attaining the object sought in an engagement? A. An effective fire employed by the assailant in one case, or by the defender in the other.

3599. Q. What constitute the two essentials in producing an effective fire? A. The first essential is fulfilled when the soldier uses his weapon at distances which give him the best chance of hitting his mark; the second when he knows how to reap advantage from cover, and how to save himself from the effects of hostile fire by adroit movement when in open ground.

3600. Q. What should every man be taught? A. To utilize to the fullest extent all kinds of cover that may be available, either in his advance or when he takes up a position of rest or defense. It is also of paramount importance that he should be practised constantly in quitting cover, both for advance and retreat.

3601. Q. In what manner should a soldier fire from shelter? A. If behind a thick tree, he should fire from the right side of it, resting his left elbow against the trunk, which covers his body; if the tree is slight and does not afford much protection, it must merely be used to steady the rifle. If firing from a window or through an opening or loophole of any kind, he should rest against the left side of it. If behind a bank, or hasty parapet of earth, the rifle should be rested on the crest, the soldier standing, kneeling or lying down behind it, according to its height from the ground or trench. If firing from behind hedges, standing corn, or anything which only gives concealment from view, the soldier should, if possible, change his position immediately after discharging his rifle. Should there be no cover, the soldier may lie down flat with his elbows on the ground (or as taught in the American service, when acting individually, on his back) and



steadying his rifle with sticks or a small pile of stones, or anything immediately available for the moment.

3602. Q. What should be impressed on the men with regard to ammunition before they are permitted to fire? A. That the ammunition should not be wasted during an engagement; that not a single round should be expended without a fair prospect of its being effective.

3603. Q. What is the limit for aimed fire at short and medium ranges against various objects? A. An enemy whose head can only be perceived, up to 200 yards; men half-hidden by cover, up to 400 yards; skirmishers or infantry scouts advancing or retiring, up to 500 yards; extended infantry in the open, or single cavalry scouts, up to 600 yards; groups or troops in support, up to 700 yards; reserves, or a battery of artillery, up to 800 yards.

3604. Q. When should volley-firing be generally employed and at what distances found effective by sections? A. At a section of infantry in close formation, up to 1000 yards; a half company of infantry or two guns of artillery, up to 1200 yards; battalion or company columns, or compact bodies of artillery or cavalry, up to 1700 yards.

3605. Q. What should men be taught with regard to the liability of firing too high? A. They should be taught to fire low, because if too low, the bullets may yet strike by ricochet, and at any rate make the enemy hesitate to come nearer. If fired overhead they have rather a tendency to encourage the enemy and cause him to quicken his advance.

3606. Q. What are the general conditions under which the soldier has to act in infantry combat? A. This is considered under three heads. *First*—When approaching to attack an enemy who is more or less under cover. *Second*—When approaching to attack an enemy who advances to the encounter. *Third*—When awaiting behind cover the expected attack of an advancing enemy.

#### THE INFANTRY SOLDIER IN ATTACK AND DEFENSE, ALONE OR IN DETACHED GROUPS.

3607. Q. How should the soldier acting alone, when advancing against an enemy more or less under cover, govern himself? A. He should move rapidly from one shelter to another, without bending down or assuming a creeping attitude at the long distances. The upright position at long ranges is as safe as the stooping posture, and better enables a man to keep his eye on the enemy and to select the best cover for himself as he advances. He may carry the rifle at a trail or in the most convenient manner to himself.

3608. Q. When should the advancing soldier deliver fire? A. When he comes within medium ranges, but always at the halt and

from behind cover if it is available; he should deliver it slowly and deliberately at first, but more rapidly as he closes upon the enemy's position.

3609. Q. How should the advancing soldier work up to the enemy from 800 to 500 yards? A. The danger of being hit being not very great for a single man, he may allow himself to be clearly seen when crossing open spaces, for he can thus advance more rapidly and with fewer halts, which are no advantage to him until he begins to fire.

3610. Q. When does cover to the advancing soldier become of great importance? A. In crossing the space which lies between 500 and 300 yards. He should rush from one point of shelter to another at full speed, and if the ground is bare he must occasionally throw himself flat down, to take breath and also to fire.

3611. Q. What action should the advancing infantry soldier take when he is nearer than 300 yards to the enemy? A. He must select points of shelter close to one another, and either dash on from one to the other with a spurt, or creep or crawl up.

3612. Q. The closer the soldier is to the enemy, what must he do regarding grouping? A. He must endeavor to group with his comrades behind each sheltered resting-place, for the purpose of bringing a rapid and continuous fire to bear on his adversaries in preparation for the final rush.

3613. Q. What should be the conduct of a scout in front of a group-working up to an enemy whose position is not quite known? A. He should not at once double out to a fixed distance and post himself. He should work gradually up to the front with due precaution, taking every advantage of the ground to conceal himself, not only to try and get a sight of the enemy, but also to select good cover for the group to move up to, while he himself again advances to reconnoitre.

3614. Q. How should a small group advance against an enemy for the purpose of attacking him? A. The group should be extended for attack by files, with intervals of three paces between the files, and should advance from point to point taking every advantage of cover until within firing distance. The rear-rank men then come up into line with their front-rank men, and the group advances in extended order as a fighting line. If the group be of more than four men some of the party may follow in support until the group nears the enemy, when, taking advantage of a halt behind cover, they double up and reinforce the fighting line. If a scout is out in front, he should wait under cover on arriving near enough to the position to reconnoitre, and join the fighting line in the final advance.

3615. Q. What line of conduct should govern an infantry soldier, acting alone and separated from his comrades, who desires to attack an enemy who advances to meet him? A. He should

seize the opportunity of firing from behind his own cover when his adversary shows himself in the act of advancing, and make a rush forward to the next cover at the instant he sees the enemy about to halt, and in the act of looking out for shelter.

3616. Q. In what manner should an infantry soldier fire at a single cavalryman, at mounted officers, and at artillery? A. He should endeavor, if at any distance, to aim at them when a side-view of the horse is obtained. If they are close, the horses should be aimed at when in motion, and the riders when at the halt, or when in the act of turning their horses. Aim should always be taken at the horses of guns when artillery is in motion; when unlimbered, the men of the gun detachments should be fired at; if at long range, the moment of unlimbering or limbering up should be watched for, as then the men and horses are all close to one another.

3617. Q. What should be the action of a group of men behind cover when the advancing enemy reinforces his fighting line? A. The men must increase the rapidity of their fire to the utmost, preserving accuracy, in order to counterbalance the enemy's accession of strength.

3618. Q. How should an individual soldier or group maintain a running fight in retreat? A. Whether the retreat be forced or voluntary, it should always be conducted in good order. The soldier should fall back at a rapid pace from one point to another, turning to fire when under shelter, and then make up further rushes to the rear, in succession, until beyond range. If three or four men are falling back together, two should first retire, a little scattered and turn to fire from behind cover, while the others pass between them at a run to more distant shelter, when they in turn open fire, and so on. If cover does not exist, the men should throw themselves on the ground and maintain the running fight by firing as above described while on the ground.

3619. Q. What should be the action of an infantry soldier if attacked in the open by cavalry? A. Unless the numbers be overpowering, if suddenly overtaken his best chance of escaping injury is to throw himself flat on the ground—his worst chance is to run away. If the soldier is attacked by a swordsman, he should try to keep on the left side of the mounted man, and if he endeavors to bayonet his an adversary's horse he should stab it in the flank, never in the chest.

3620. Q. What is the method of conducting the attack by infantry with a group of ten or twelve men? A. A portion of the party would be retained in support at a convenient distance in rear. The support, extended by files, at two or three paces intervals for the early movements, would join the fighting line at the critical moment of the advance, or be employed to turn the enemy's flank.

3621. Q. If the attacking party should have to retire before the

reinforcement of the fighting-line has taken place, what should be done? A. The support should cover the retreat of the latter by extending to open order, lying down under cover, and opening fire on the enemy when the front is cleared by the fighting line having passed to the rear. The fighting line would then take up a sheltered position to cover the retreat of the support.

3622. Q. How should a party of ten or twelve infantrymen act on the defensive? A. All the men should be kept together in the front line; but, position should, if possible, be taken up in such manner that two or three men would be under cover in a group together at an interval of some ten yards or so from the next group. The disposition must, however, in all cases be so much influenced by the ground that no precise course of action can be dictated.

3623. Q. If men become dispersed in action, what should they do? A. If separated from their own leaders they should form in groups under the nearest non-commissioned officer or the oldest soldier, and even if two privates are alone together, one should take command. In the fighting line, small compact bodies here and there, according as cover enables them to collect, are of great value, forming good rallying-points and adding solidity to the line.

#### THE COMPANY OF INFANTRY IN ATTACK.

3624. Q. What is the strength of a company of infantry on a war-footing, and how divided. A. One hundred men, divided into two platoons and four sections.

3625. Q. How is a force of infantry, intended for attack, divided? A. Into first, second, and third lines. The first, or fighting-line, is subdivided into firing-line, supports and reserves, and is to engage the enemy and break down his resistance by fire-action, under cover of which it advances to charging distance. Thence it delivers such a heavy, rapid fire as to enable the second line to close up immediately behind it, in readiness to pass through the firing-line and assault the position. As the second line advances to the assault through the first line, the latter ceases firing and joins in the attack. The third line backs up the two front lines, and is intended to confirm a success, or, in case of a reverse, to enable the leading troops to retire.

3626. Q. What is the normal procedure of a company when acting as a portion of the first line in attack? A. The captain should point out to the company the position it is intended to assail, and some prominent object in a direct line with it must be noted, so that the men may clearly mark their line of advance. A non-commissioned officer is detailed to be responsible for the correct marching of the centre file of the company—that is, for the company named as the directing company of the battalion.

3627. Q. When is the attacking force said to be within the first

zone (or within the range of artillery fire), and what is then done  
A. When within 2500 yards; it is then formed for attack, the company being divided into the firing-line and supports. The second and third sections advance to form the firing-line under the junior lieutenant, the two flank sections following at 200 yards' distance as supports under the senior lieutenant. These two last sections maintain, as far as possible, positions in rear of the outer flanks of their firing-line; scouts are sent out to reconnoitre.

3628. Q. What is considered the second zone, and what is then done by an attacking company in battalion? A. The second zone is within 1400 yards of the enemy; here the firing-line forms line of sections, and continues to advance; at 1200 yards it forms line of squads; when about 900 yards from the position, the squads will be deployed into a line of skirmishers, with three paces interval.

3629. Q. What is considered the third zone, and what is then done by an attacking company in battalion? A. The third zone is within 800 yards of the enemy, and when that distance is reached the firing line has reached effective range and firing is permitted; but, the captain must decide when it is to commence and to what extent it is to be employed. At this stage the fire will be nearly all delivered by volleys. The section commanders in the front line will receive instruction to fire by volleys by alternate sections, or both sections to fire one or more volleys at each halt. In each case of ordering a section to fire, its commander will first point out the precise object at which aim is to be taken, and give out the range so that the men can adjust their sights thereto. During the short halts, the supporting sections close up to 150 yards from the firing-line.

3630. Q. What must the sections in the firing-line of an infantry attack do, while advancing, as regards each other? A. They should work together as far as possible, halt at or about the same time, advance again together after the fire of the section has been delivered until at 500 yards. Thus, the line may make a momentary halt under any available cover, No. 3 section delivers a volley, and No. 2 section rushes to the front to the next suitable spot. If no cover is to be had, the section is halted when it has gained fifteen yards, and the men throw themselves flat on the ground. They then fire one or more volleys as directed, when No. 3 section will rush forward and lie down about fifteen yards in advance of the line of No. 2. In this manner the advance will continue.

3631. Q. During an attack, while the sections are advancing by rushes, what should the support be doing? A. While the men are halting to fire, the support gradually approaches the firing-line. On the order to reinforce being given (which should be delayed as long as possible), the sections in support will extend to open order, and move up rapidly on the flank or flanks of the

firing-line. When both sections have reinforced the firing-line, the lieutenants will each command his own platoon in the firing-line.

3632. Q. What is the movement of the firing-line after the supports have joined it. A. The company continues to advance by alternate platoon rushes, volleys being delivered either by platoons or sections, until some favorable ground about 150 yards from the position is reached, when the captain selects some favorable ground from which to make the assault, and having obtained this position he causes rapid fire to be made. If any of the supports have not been brought up, they join the line at the command rapid fire.\*

3633. Q. What is the duty of the firing-line from the moment it arrives within effective range of the position assailed? A. It must maintain a constant fire (as a rule by volleys) upon the defenders.

3634. Q. What is the duty of the support as the attack develops? A. The support must reinforce the firing-line, in order to keep up a strong fire and prevent its slackening. It will in the first instance follow the firing line in echelon, and must be prepared to resist a flank attack upon the firing-line as it advances, and generally to give strength and confidence to it.

3635. Q. What must be done if the assailed position is taken? A. The commander must restrain his men from pursuit, and with the aid of his officers, reform the company as soon as possible, contenting himself with harassing the retreating enemy by one or two parting volleys.

3636. Q. What should a commander attacking a position, endeavor to do, when anything like equality of force exists? A. He should endeavor to attack the flanks of his adversary, even by the smallest possible detachments. During the progress of the engagement no opportunity should be lost by section-leaders, of taking the enemy's line or a part of it, in flank, by small groups of men judiciously disposed. At the final stage too, even when the reserve has been brought up close to the support, but is not yet committed to the fight, the commander may see that a front attack would be unsuccessful, and that a prolongation to a flank may be made, under cover of the ground, by part or the whole of the force in hand, by which means the enemy may be successfully taken in flank at the moment when his whole attention may be absorbed by the rapid fire of the firing-line.

3637. Q. What is the special duty of the support during the preliminary advance for attack? A. It is to watch for flank attacks from the enemy, notice of which should be given by

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\* All questions following this, which relate to the "Attack and Defense of Infantry," refer to general conduct, as the method in the text-book is somewhat different from the American Drill Regulations.

flanking scouts; the reserves and second line, if there is one, must further take their share in resisting them, should the danger from this source be great, especially when both flanks are more or less exposed.

3638. Q. When is it advisable to retreat, instead of assaulting, at the final stage of attack? A. Should the commander, at the commencement of the final stage, see that a front attack must fail, and that a flank attack is impossible, he should then endeavor to retire, although such a movement can only be carried out with considerable loss. The rear sections, if acting as a reserve, and not already launched into the firing-line, will enable the latter to fall back under covering fire. The reserve itself, deployed, may then retire by echelons of sections, through the firing-line, each section firing a volley before its retreat. The firing-line, lying down, or sheltered behind cover, must open a rapid fire as the reserve retires through its ranks. The commanders of the sections should make every effort to retire in good order.

3639. Q. What is the great difficulty in retreats? A. It is to choose the exact and proper moment for retiring, for a retreat should never be precipitated so long as any chance of success remains. If, however, the retreat should be protracted too long, and the reserve be merged into the front line before the necessity for falling back is admitted, the retirement might easily become a rout; for a line retiring under fire, without support at hand, must almost inevitably fall into confusion.

3640. Q. What is the distribution of an infantry force on the defensive? A. It is much the same as in the attack, but its duties are necessarily different. The firing-line will occupy as much ground in the extreme front of the position as may be decided to be taken up. The supports and reserves will be concealed from the view and fire of the enemy as much as possible, and near enough at hand to feed the firing-line, as casualties occur, or to move to whatever part may require urgent aid.

3641. Q. What is the mode of posting the firing-line on the defensive, when the country is close and the position well suited for defense? A. If on the crest-line of a hill, with an easy line of retreat, the supports and reserves may be nearer to the front, and the firing-line need not be so strong as would be necessary in open ground, with hasty earth-cover alone available to shelter the defenders. The portion of the front line of defense to be held being indicated to the captain, he decides the manner in which it must be occupied. At the most probable points of attack, the men will be as close as possible, allowing free use of the rifle; while at other points, if the ground is difficult of access in front, they need not be so thickly posted.

3642. Q. The ground having been marked out for occupation, on the defensive, what should be done with the company, and

what should the captain ascertain at this point? A. The company should be kept back under cover during the early part of the defense, and the captain should take this opportunity of ascertaining the ranges to all marked objects in the line of advance; both he and his section-leaders making a careful note of the same.

3643. Q. What should be done by the defenders of a position when the enemy has entered the second zone? A. The order for the firing-line to move into position is given, upon which the troops take post as has already been arranged. Long-range volleys by platoons or sections may now be directed upon the enemy, if a favorable opportunity offers. Should casualties occur in the two centre-sections under the enemy's fire, they will close on their centre, and the gaps on their flanks will be filled at once from the supporting sections.

3644. Q. At medium ranges, what must be done at the points specially threatened by the enemy's advance? A. They must be strengthened by full reinforcement from the supports, and, if necessary, from the local reserves. If the company is stationed at one of these points, the support will be moved up in full to the firing-line, and the captain will take post in rear of its centre. Volleys will now be fired, not only at the enemy's skirmish-line, but at his supports and reserves as they come well into view.

3645. Q. At what point of time is it best for the defense to aim the volleys at the enemy's firing-line? A. When each alternate portion of it makes its rush to the front, and becomes for the moment fully exposed.

3646. Q. What is done by the defense at the last stage, if the enemy is not beaten back? A. The firing line is finally reinforced by the reserves, and independent fire will be employed.

3647. Q. What is done by the second line of the defense when the enemy prepares to assault the position? A. It fixes bayonets and moves up to the rear of the firing-line, to meet the assailants, if they attempt to storm the position.

3648. Q. If there is a third line of defense, what might it do at the time the enemy assaults the position? A. It may possibly, at this stage, move out to a flank, in order to make a counter-attack as the enemy assails the front.

3649. Q. What must be done by the defenders if the assault of a position should fail? A. The troops remaining in position should fire volleys on the retreating enemy, and the third line, if there be one, make a counter-attack, according to circumstances.

3650. Q. What is done by the defense if the defenders are driven from their position? A. The first and second lines must endeavor to retreat (under cover of the third line, if there be one).



## THE COMPANY ACTING ALONE IN DEFENSE.

3651. Q. How should a company ordered to take up a position of defense regulate its march to such position? A. It should move to its ground in the usual order of march, unless within reach of the enemy, when it should advance in fighting order, preceded by scouts. At about 150 yards from the position, the leading section is halted, and the scouts are reinforced so as to enable a complete reconnoissance to be made, by which the commander can learn, not only if the ground itself is clear of the enemy, but if there is any indication of his presence in the immediate vicinity.

3652. Q. If an examination of the position to be occupied by a company acting alone on the defensive be satisfactory, how should the commander proceed to occupy it? A. The leading section may be marched up to the position, which it occupies from flank to flank, the men getting behind cover or lying down in temporary positions till the front line is finally fixed. The commander looks to the approaches, the flanks, and the best means of retreat, and then as quickly as possible decides upon the position for his firing-line. It may be composed of the leading section, which is accordingly posted in a general line, behind the most suitable cover from which the ground in front can be brought under fire. A few well-advanced posts are occupied by groups, provided the ground is favorable, for the purpose of making the enemy develop his line of attack. The support should be placed in as sheltered position as possible in rear of the firing-line, and so close at hand that no difficulty can arise in reinforcing the latter, as required during the engagement. It should consist of No. 2 section. The remainder of the company should be held in hand in rear, part to act as local reserve and part as a second line, or both sections to be employed in whatever way required as the attack developed. It may be moved, either wholly or in part, so as to be in the most favorable position, if mere passive resistance is intended, for quickly reinforcing the threatened part of the front line, or for repelling a flank attack of the enemy, or for the purpose of taking the offensive and delivering a counter-stroke upon the assailants at the proper moment.

## ATTACKS WITH THE BAYONET.

3653. Q. How should attacks with the bayonet be conducted? A. Except where opportunity arises of surprising an enemy by a rush upon him, or of seizing rapidly upon a position or ground which he has not yet altogether taken up, no attack with the bayonet should be made without having been preceded by such a heavy and close fire as to break the enemy's line and throw him into confusion. Attacks with the bayonet, when they are premature or rash, result in disorder and heavy loss, and are

easily converted into a rout. A bayonet charge once engaged in should be pressed vigorously home. At the close range at which bayonet charges alone can take place, the enemy's fire is really less effective than at longer distances, and once the charge has commenced, the best chance of safety lies in the advance, since the loss would certainly be doubled by retreating at such a stage.

#### ATTACKS BY CAVALRY.

3654. Q. What should be the conduct of a firing-line of infantry attacked by cavalry? A. If in the open, men may form files or groups, according to the amount of danger from the charge. It is always an advantage to have clear spaces in the line, through which a portion of the cavalry is sure to pass without doing any injury. The extended line should then lie down and allow the supports to complete the rout of the cavalry, or of what remains of them after the charge upon the fighting-line. The supports, as a rule, will receive cavalry in line in double ranks. Denser formations can hardly ever be necessary; but if the cavalry presses upon the support, the flanks of the infantry may fall back so as to form in double-rank around the commander.

#### ATTACK AND DEFENSE OF CAVALRY.

3655. Q. From what source does the proper tactical employment of cavalry in combat derive its special attributes? A. The horse gives to cavalry two qualities—rapidity of movement and weight of shock. By means of the former, cavalry can pass with celerity from one part of the field to another during action, in order to operate by surprise on distant points, to profit by any mistakes on the part of the enemy, or to reinforce quickly a weak part of the defense. If driven back or required elsewhere, it can retire as rapidly as it has advanced. In the pursuit, also, after an engagement, cavalry, by its superior mobility, comes into preferable use before the other arms. By its weight in shock action, cavalry has the power of breaking the enemy's formations, or of exercising moral control over his movements by its presence close by or near at hand.

#### CAVALRY IN ATTACK.

3656. Q. What formations are used by cavalry in attack? A. In line, generally in close order; sometimes in extended order.

3657. Q. How is the cavalry attack in close order made, and for what purpose? A. It is made in two ranks, if numbers allow, the men riding knee to knee. This compact formation gives the

greatest possible power of shock, and it is always employed in charging cavalry.

3658. Q. When is extended order made use of by the cavalry in attack? A. Against infantry or artillery, when it is desirable not to present a compact object to the fire of the enemy, and when the effect of the shock action of the charge is not required to break a formation. It may also be employed in the pursuit of a broken or dispersed force of the enemy of any army.

3659. Q. How does a cavalry attack commence? A. By a movement in advance, increasing in rapidity as the enemy is neared, which is followed by the shock of encounter, and is terminated by personal engagement. It is necessary, for complete success, not only that the enemy's formation should be broken, but that his tactical disposition should be altogether upset, and that he should suffer such serious loss as to be unable to re-enter the lists as a combatant during the engagement.

3660. Q. What are the two fundamental principles for the conduct of cavalry in attack? A. That it should constantly seek to attack the enemy's flanks, and that it should never attack at all without keeping a portion of its strength in reserve.

3661. Q. Why is the second of the two fundamental principles of cavalry in attack in direct connection with the first? A. As the enemy's flanks should be assailed because they are the weakest points, so an officer of cavalry should protect his own flanks from attack by keeping troops in hand.

3662. Q. Why is it absolutely necessary to keep a reserve disengaged during a cavalry attack? A. After a successful cavalry encounter, the victors and the vanquished are alike in disorder, and the most that can be said in favor of the former is that they can rally more quickly. If a reserve is in hand, it will cover the operation, and complete the enemy's defeat. But if no reserve has been kept by the victors, the smallest body of fresh troops coming up in aid of the enemy may rapidly turn victory into disaster; for cavalry are never less able to resist an attack than immediately after a charge.

3663. Q. What should be the aim of a cavalry commander, and what should he do in preparing for an attack? A. His aim should be to place his men in such a position as to render their subsequent charge upon the enemy as effective as possible. Thus the force should be kept out of sight and out of fire until the time for action comes. Ground-scouts should be sent out to reconnoitre to the front and flanks, so as to assist the commander by their inspection of the ground, and reconnoitring groups must also be dispatched to the front and flanks, in order to afford early and constant intimation of the position of the enemy.

3664. Q. What would be considered the most suitable occasions for a cavalry attack? A. When accidents of the ground enable the force to reach striking distance unobserved, so that the at-

tack becomes a surprise ; or, when the enemy, appearing to feel the effects of infantry fire, hesitates in his advance and seems disorganized; or, when the infantry itself, being pressed by the enemy, requires time to rally and reform, and to have attack diverted from it for the moment. A careful watch should be kept upon the enemy's artillery for opportunities of successful attack on his guns. Any symptoms of disorder among the troops of the enemy should be taken advantage of.

3665. Q. Why should the exact instant of time selected for an attack of cavalry be of the highest importance ? A. If the attack be premature there is no chance of surprise, and the design becomes apparent to the enemy ; should it, on the other hand, be too long delayed, not only is the golden opportunity lost, but the enemy, warned in time, may himself attack during the deployment, thus reversing the intended action.

3666. Q. What influence has the ground upon an attack by cavalry ? A. Although good, well-trained and well-mounted cavalry will ride in fair order over broken ground, the effect of a charge under such circumstances is much impaired. If the soil is saturated with wet and the ground heavy or swampy, or if the land is plowed, or deep in sand cavalry move with more or less difficulty. Generally, open ground, even if much more varied by accidental features, is favorable, provided there are passages by which small columns can move from one open space to another. In open, level ground any attempt at surprise on the part of cavalry becomes impossible; but open, undulating ground is the best for such purposes, and the next best is a combination of open and enclosed or wooded ground.

3667. Q. What is the actual space necessary for a cavalry attack ? A. There should be room enough to the front for the cavalry to advance with sufficient force deployed, not only for the charge, but for the further *mêlée*, and perhaps pursuit, and this is in proportion to the strength employed. There should be space at the sides for the movements necessary in a flank attack. The ground should also afford means of retreat to the rear, and there should be no insurmountable obstacle upon which, if unsuccessful, the cavalry might be suddenly forced back.

3668. Q. What may be included under the head of *direct attack* ? A. Every form of frontal encounter, even though the direction of the actual charge may be more or less oblique to the enemy's line.

3669. Q. In the direct attack by cavalry what is the result in proportion to ? A. To the weight and strength of the horses, and to the steadiness and compactness of the charge.

3670. Q. What may be included under the head of *flank attack* ? A. All cases of attack from any direction, in which a portion of the assailants' line overlaps or outflanks the enemy, and is, therefore, able to wheel up at the moment of attack, as

well as those in which attack is made directly upon the enemy's flank.

3671. Q. Why is an overlapping on the flank dangerous, if the attacking line is only equal to the opposing line of cavalry? A. By attaining advantage on the one flank, it would lay itself open to a corresponding disadvantage on the other flank. Should it be attempted, the weak flank of the assailant must be refused by keeping it in echelon.

3672. Q. Which attack of cavalry is the most telling in its effects on the enemy? A. The direct attack upon a flank; it can be effected by the smallest possible detachments, even against larger bodies of troops, provided that the attack is unlooked for on the part of the enemy, and vigorously pushed before he has time to meet or avoid it.

3673. Q. How should flank attacks by cavalry be carried out? A. By working up under cover to striking distance from the enemy's flanks. In a varied country, facilities are afforded for such manœuvres, though a watchful enemy would hardly permit their accomplishment. When such mode of approach is impossible, the flank attack must be made in combination with a front attack.

3674. Q. What are combinations of front and flank attacks termed, and what are the detachments by which they are made called? A. They are termed *offensive flank attacks*, and the detachments are called *offensive flanks*.

3675. Q. How should the *offensive flanks* move in an attack by cavalry? A. They follow behind the wings of the attacking line, echeloned to the flank, and move out therefrom at an increased pace just before the charge, so as to combine with the front attack by a simultaneous movement on the enemy's flank. They are also employed to ward off or resist counter-flank attacks on the part of the enemy during the advance, when they are called *defensive flanks*.

3676. Q. If the charge of an attacking force of cavalry is successful, and the support and reserve undertake pursuit, what is done with the charging column? A. It is rallied and re-formed as soon as possible, so as to serve in its turn as a support to the pursuing force.

3677. Q. If the charge of an attacking force of cavalry is unsuccessful, what should the attacking force do? A. It should retire in such manner as to avoid clashing with the support or reserve, which, at this moment, should be ready to attack the enemy in flank on his attempting to pursue. With this object in view, the first line should, as a rule, fall back over the ground by which it has advanced. It should, of course, rally and come up again, if possible, in formation to act as support or reserve.

3678. Q. What is said of false or threatening attacks by cavalry in combination with infantry? A. A false attack is

made by cavalry, which then retires before the enemy's cavalry, drawing the latter under fire of concealed infantry.

#### ATTACK IN DISPERSED ORDER.

3679. Q. How, as a rule, should attacks by cavalry be made in dispersed order? A. Except in the case of very small bodies, the attack in dispersed order should be made only by a portion of the force, the remainder being kept in reserve, or acting as a second line in close order. A platoon is the smallest portion that should be kept in support.

3680. Q. How might extended order in combination with close formation be made use of by cavalry in attack? A. If a squadron is directed upon artillery protected by an escort, a troop or half troop should "swarm" upon the guns, while the remainder of the squadron in close formation attacks the escort.

3681. Q. Why should a general attack by cavalry in extended order be rarely made? A. It is sometimes necessary as being the only mode in which cavalry can advance in the face of a heavy fire, from which no degree of gallantry can save it. Such an attack in dispersed order, the line gradually closing in from the flanks, may possibly succeed; but the movement is always dangerous, and should not be attempted unless the force is exceedingly well disciplined and accustomed to rally quickly after attack. It should be well backed up by cavalry in support.

3682. Q. How might the enemy be checked awhile, and forced to lose time by manœuvres? A. By making a demonstration in dispersed order with a large force of cavalry, without any real intention of attack.

3683. Q. In working cavalry in extended order, what should be done when the rally is sounded? A. Whether during the advance or while retiring, every man should close at once on his leader, facing towards his proper front without regard to his former place in the ranks.

#### CAVALRY IN DEFENSE.

3684. Q. How should cavalry be employed in defense? A. The enemy's cavalry must be watched, especially in varied ground, to forestall attacks upon unprotected flanks of the infantry, and generally to prevent outflanking manœuvres. The flanks of infantry and artillery in forward movements must be guarded. In the case of attack by the enemy at any special points the cavalry should seize opportunities of time and ground for charging, if the assailants waver or hesitate in the advance, or immediately after the assault has been made. Cavalry may also be used in large bodies for masking movements and making demonstrations.

3685. Q. Why may little be said on the local defense of cavalry? A. Because the only means of local defense of cavalry lies in counter-attack, or in a quick avoidance of the enemy when attack is impossible.

#### THE CAVALRY SOLDIER IN ATTACK, ALONE, OR IN GROUPS.

3686. Q. What is the conduct of a cavalry soldier in an attack when acting alone? A. He must act boldly, but with circumspection. He should endeavor to approach his adversary unseen, until within charging distance, and then ride at him with determination. If the soldier carries a sword, he should endeavor during the encounter to keep his right front opposed to the enemy, or at all events to prevent the enemy getting upon his left rear. Against infantry, every parry should be made so that the strong part of the cavalry weapon, that is the fort of the sword strikes the feeble part of the infantry weapon, which is the bayonet fixed on the end of the rifle.

3687. Q. How should a group or small party of cavalry attack? A. A Group or patrol of some half-dozen men would probably charge a similar cavalry patrol knee to knee. If attacking an infantry patrol moving, as is most likely, in open formation, the cavalry group would swoop down in dispersed order. Against infantry in any collected formation, if the ground be favorable, both the moral and physical effects of a charge in close formation would be greater than if made in extended order.

3688. Q. What consideration must be shown the horse by cavalymen when attacking in close order? A. The men must avoid the crowding of the files at the instant of the charge, as it tends to impede the free movement of the horse. At the moment of shock, the horse, although kept well in hand, should, if necessary, receive pressure from leg and spur. The greatest effect in a charge being derived from the uniform velocity of the force, whether large or small, the pace must not be so hurried as to bring up the horses to the attack blown or even distressed. All the horses should be kept square to the front, and never, if it can be avoided, allowed to get out of hand.

#### SMALL BODIES OF CAVALRY IN ATTACK.

3689. Q. What would be the conduct of a very small body of cavalry in attack? A. To retain a support is not advantageous. One or two ground-scouts would precede the party about 200 yards to the front, during the advance, in order to reconnoitre the ground. If a surprise be intended, the scouts must be especially careful to keep themselves concealed from the enemy. Where a strong troop is acting alone, the attacking portion

might consist of a platoon in double ranks, the other platoon forming the support in echelon at 150 or 200 yards' distance.

3690. Q. How should all bodies of cavalry, under the strength of a troop, direct their charge? A. As in the case of that body, by the centre; the men being careful to keep up to and dress by the centre, without closing in or opening out more than is unavoidable, care being taken that the flanks are not in advance of the centre.

#### THE TROOP IN ATTACK.

3691. Q. How should an attack by troop be carried out? A. The point of attack having been indicated at some 1000 yards off, two or three ground-scouts should be sent to the front and a small reconnoitring group to the front and to either flank. The scouts are to reconnoitre the ground to be passed over in the advance, and the groups are to search carefully all ground that might conceal an enemy, and thus prevent a sudden attack upon the squadron, by giving the earliest intelligence of the enemy's presence. The troop, on receiving the order to advance, moves off at a walk in a small column formation. If the column of fours is made use of in the first instance, it should be formed with due regard to the exposed flank, so as to be more quickly brought into fighting formation. When the troop comes under the effective fire of the enemy, a brisk trot must be assumed and kept up to within 600 or 500 yards from the point of attack. Column of platoons may then be formed, and the rear platoon checking its pace, follows in echelon on the exposed flank, at about 150 or 200 yards distance from the leading platoon. The latter now breaks into a gallop, the rear rank taking a little distance if the ground is at all broken, swords being sloped. The platoon or troop leader heads the attacking force; \* the platoon in support is under command of its own chief.

3692. Q. What principles are to be borne in mind in an attack by cavalry on a force in position? A. That whatever the distance to be passed over in the preliminary advance may be, it should always be traversed at a rapid pace, if under the enemy's fire. The trot is therefore assumed as soon as the zone of effective infantry fire is entered; the column formation should be preserved until just before the pace of the gallop is to be assumed. If the enemy is advancing to meet the attacking force, the pace must be so regulated as to be greatest at the moment of actual encounter.

3693. Q. How should the gallop be conducted in a charge of cavalry? A. It should not be too hurried when first entered upon,

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\* In the English service this attacking force is described for a squadron; the change to platoon is substituted for the American service.



but the speed gradually increased until charging distance, or about 50 yards from the point of attack.

3694. Q. What is the duty of the support, and what becomes of the ground-scouts in a charge of cavalry? A. As the charge is about to commence, the scouts clear off to either flank; the support, following in echelon on the exposed flank, should endeavor to manœuvre against the flank of the enemy or ward off any attempted flank attack by the latter.

3695. Q. Why should cavalry endeavor to charge down a slight incline of ground? A. Because the slope of the ground gives an impetus which nothing can stop.

3696. Q. Under what conditions might a troop of cavalry of full strength attack infantry? A. When the infantry is demoralized or inferior in quality; or when they may be taken by surprise, the cavalry having been able to approach to striking distance unobserved; or the infantry have expended their ammunition or have broken by the fire-action of opposing troops; or the infantry should be in extended order and exposing unprotected flanks to sudden cavalry attacks; or being in extended formation, induced to close up by the moral effect of a demonstration of cavalry. In the last case, the attack in extended order would often be the best method.

3697. Q. Why should cavalry, if possible, attack the right flank of infantry in preference to the left? A. Because the effect of the fire of a line of infantry is greater toward its left flank than towards it right.

3698. Q. Why should it be of advantage to cavalry to charge up a slight incline in attacking infantry? A. Because in this case the infantry fire is apt to be directed too high.

3699. Q. If the troop of cavalry is ordered to attack in pursuit, how may that be conducted? A. A portion of its strength might be advanced in dispersed order, the remainder following in closed ranks, in case of an offensive return being made by the enemy. Should it, however, be ordered to attack in dispersed order, for the purpose of harassing the enemy, or making a demonstration against extended infantry, a small portion only would be retained for support.

3700. Q. What would be the general conduct of attack on artillery by cavalry? A. The attack should be made, if possible, when the guns are limbered up. If the guns are in position, they should be attacked either on the flanks or in rear. If the guns are escorted by other troops the combination attack should be made on troops and guns at the same time by different portions of the attacking force. If unlimbered, the horses and limbers of the guns should be carried off, or at any events, attempts should be made to cut traces and kill horses. If the battery be on the move, no measure is so effectual as shooting one or more of the wheel-horses.

## DISMOUNTED SERVICE OF CAVALRY.

3701. Q. When should cavalry never be dismounted? A. When mounted opposing cavalry could attack them,\* before they can remount, or where the led horses would be under direct fire.

3702. Q. What are the general conditions under which cavalry might be required to act dismounted? A. To hold localities until the arrival of the infantry; † to force a defile which blocks the advance, when it would take too much time to turn it; during a retreat to offer enough resistance to compel the enemy to deploy, thus gaining time; as a support to defeated cavalry retreating through a defile; and to defend camps, etc.

## ATTACK AND DEFENSE OF THE THREE ARMS.

3703. Q. What instructions should the commander of a force combining the three arms of the service have, and why? A. He should have the clearest possible conception of the general objects which it is intended he should carry out, in order that, when he comes in contact with the enemy, he may form a correct decision as to whether he should attack or act on the defensive.

3704. Q. What course of action should be preferred if his position and means at command allow of either course being pursued? A. The preference should generally be given to the attack; in order to secure the moral advantages which attend this course of action.

3705. Q. What should a commander do with regard to attack, if the nature of his position and resources necessitate his assuming the defensive? A. He should seize upon the first favorable opportunity of turning the defense with the attack.

## THE THREE ARMS IN ATTACK.

3706. Q. What is the advantage of the offensive initiative? A. The commander who takes it has the advantage of choosing the time, and, within certain limits, the place of attack; his adversary having, as it were, to wait his pleasure on both these points before the final arrangements for defense can be made. The assailant can move his force in any direction either for the pur-

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\* An Indian woman, who was in the camp when Major Reno attacked Sitting Bull's warriors in 1876, remarked that if he had not dismounted his men, but kept right on mounted, he would have thrown the village into a state of confusion; but by dismounting he gave time for the warriors to collect their ponies and then ride all around him.

† As Sheridan did, at Five Forks and at Appomattox Court House, in 1865.

pose of real attack, or to deceive the enemy by demonstrations or false attacks, while at the same time he can push his troops in force against a weak point of the position. Attacking gives moral force to the men, and in advancing, troops leave demoralizing influences behind, such as the sight of the killed and wounded.

3707. Q. As ground rarely presents advantages to the attacking force, what should the commander of an assailing party look out for? A. For any accidental conditions which may be turned to his benefit. High ground for his artillery should be found, if possible, within range of the enemy's position. If the country is at all inclosed, or even undulating without inclosures, it can hardly happen that there are not some sheltered places affording cover for troops near to the position. These should be looked for and utilized.

3708. Q. What are the three modes of attacks? A. *First*, the Frontal; *second*, the Combined Attack on front and flank; *third*, the Concentrated Attack upon a weak point.

3709. Q. What is meant by a frontal attack, and why is this form unadvisable? A. A frontal attack means a direct advance upon the whole of the enemy's line or position. This mode of attack is unadvisable, as, even in the case of success, the result is not decisive; the enemy's line of retreat being unassailed, he simply falls back to a position more to the rear.

3710. Q. When may a frontal attack be made use of? A. To feel the enemy and ascertain his exact dispositions while preparing for a concentrated attack upon one of his weak points as soon as they are discovered.

3711. Q. How should a combined attack upon front and flank be conducted? A. In this case the enemy is attacked in front at the same time that a portion of the force is directed at one of the flanks.

3712. Q. Why is an attack upon the flanks by itself unadvisable? A. Were a strong force in position attacked solely on the flank, it would quickly form up its reserves to a new front, the troops of the original front coming up in support.

3713. Q. When might an attack on both flanks, combined with a frontal attack, be attempted? A. It can only be attempted under circumstances of great superiority of numbers, without which it would become a most dangerous operation, enabling the enemy to give the counter-stroke at a weak point of a straggling line and beat the assailants in detail by cutting their force in two.

3714. Q. What is the object of a concentrated attack upon a weak point of the defense? A. To break through the enemy's line or force his position, as it is, in case of success, the most decisive, although generally it is the most difficult of execution.

3715. Q. How should a concentrated attack upon a weak

point be made? A. The attack must always be made with force sufficient to resist a counter-enveloping attack on the part of the enemy, which might otherwise be disastrous in its results.

3716. Q. Why is it that a concentrated attack upon a weak point of the enemy is more hazardous now than formerly? A. On account of the increased range of modern guns and rifles; for a concentrated fire-action can now be brought to bear on the assailant, not only from all parts of the defense in his immediate front, but in most cases from either flank as well. Unless, therefore, the ground or other natural objects cover the movement it should not be attempted.

3717. Q. What is understood by a *turning movement* in an attack? A. It is more frequently a menace than an attack; although it might be looked upon as a form of flank attack. It differs from a flank attack inasmuch as it removes the scene of combat from the position held by the enemy. This movement may be made with a portion of the force at command, or with its whole strength.

3718. Q. Under what conditions could the turning movement be attempted by a *portion* of the force at command? A. When the conditions render it improbable, if not impossible, that the enemy could act offensively in turn upon each fraction of the divided force. Otherwise the separate movement should not be attempted.

3719. Q. How should a turning movement be conducted by a portion of the force at command, composed of the three arms? A. When the ground is favorable, cavalry and horse artillery, mounted infantry, and galloping machine-guns would nearly always form a portion, and sometimes the whole of the force employed on the service. The relative proportion of the force detached can only be decided by the circumstances. If the line of retreat of the assailants must necessarily be preserved in rear of the main body, the latter must keep the largest amount of force; if the retreat can be made equally well to the flank, the strongest force may be detached for the turning movement.

3720. Q. What conditions obtain in making a turning movement by the *whole* force of a command composed of the three arms? A. The former line of retreat must be abandoned altogether; or there should be such complete probability of success that the line may for the moment be laid open to the enemy, for the sake of concentrating the whole force in the attempt to turn the position.

#### PREPARATION FOR THE ATTACK.

3721. Q. If the commander does not have the necessary information required before forming his plan of attack, in what manner does he acquire it? A. In ordinary cases when small forces are engaged, the cavalry reconnoiters in advance will

bring in sufficient information; but if the enemy should be covered by advanced troops, it may be necessary to make a special reconnoissance, sometimes supported by guns.

3722. Q. The commander of a force preparing to attack, having obtained all necessary information, what course should he next pursue? A. He should issue orders, which would consist of a general order for all, and a special order addressed to each commander when separate action was required.

3723. Q. In what manner should the general order be framed, and what should it contain? A. It should be clear, precise, and complete, and as short as strict compliance with these requirements will permit. It should contain: The conditions or circumstances of the intended action, with what is known of the enemy; the mode of action determined upon, and how to be undertaken (for instance, to attack the enemy when he is touched on in direct advance, or to attack the whole or a certain named part of a position); the strength, composition, and general division of the attacking force, with names of commanders (this may be given more in detail in the margin of the order if thought necessary); the preliminary positions to be taken up by each distinct part of the force with their directions of attack; the hours at which these positions are to be assumed, and at which the forward movement or attack is to be commenced; the position where the commander of the troops will be found during the action, to which all references or reports are to be made or sent. And in operations of great magnitude it would be necessary to add the positions of the ambulance and field hospitals, and the order of march of the trains of the various columns.

3724. Q. What should the special orders, in preparing for attack, contain? A. Nothing that may tie the hands of commanders too much in matters of detail. They should be told the thing to do—not the manner of doing it, and be allowed comparatively free action.

3725. Q. What is the general principle of apportioning reserves for the different arms in preparation for attack? A. The various arms require reserves in exact proportion to their respective liability to fall into confusion during action. Therefore, a reserve is most necessary for cavalry, next for infantry, especially when attacking, and hardly at all for artillery, which has no shock-action. Although a reserve of guns may not be required, the artillery should certainly have reserves of men, horses, and ammunition.\*

3726. Q. What is done by the cavalry during the progress of

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\* In the American service an artillery reserve was always maintained, and proved not only of great benefit in relieving batteries, but aided wonderfully in deciding the battles of Malvern Hill, Antietam, Gettysburg, and others.

the earlier arrangements for an engagement? A. The reconnaissance of the enemy and ground would be kept up, upon whose preliminary report the commander of the entire force decides his first course of action. Great care should therefore be taken that there is no confusion in forwarding the reports of patrols. The position of the commander of the troops, as mentioned in the orders, should therefore be impressed on each patrol leader, whose duty it will be to see that every man sent back with a message distinctly understands where he is to deliver it.

3727. Q. What is required of the advance-guard in carrying out the preliminary action to cover the reconnaissance preparatory to attack? A. It must do its best to cause the enemy's advanced troops to retire. When it finds itself definitely checked, it must look for support from the main body. The artillery is the first up, and either joins the battery of the advance-guard, or, taking a position abreast of it, acts in combination and opens fire in concert with it. Both mounted infantry and machine-guns can be used in these operations.

3728. Q. If the enemy's advanced troops have been driven back in preparation for a general attack, what is then done? A. The reconnoitring position would be abandoned, and the guns moved on to the first principal artillery position. Accompanied by the necessary supports, they should be pushed well to the front and come into action at a point selected with due regard to the direction of infantry attack, so far as known at the time and at a range of from 1800 to 1300 yards from the enemy's general position. The place chosen ought not to be such that the advance of the attacking infantry will soon mask the fire of the guns. If centrally placed, they will be protected by the troops on either side; if on a flank, they need only be escorted by cavalry, or by a small force of infantry on the exposed flank.

3729. Q. What would be done with the guns at the first principal position in the case of large forces attacking an enemy? A. The guns would probably be massed in one or two strong batteries, and all other available guns, exclusive of any required for a flanking movement, should be quickly brought into simultaneous action.

3730. Q. What is done with the infantry, during the fire of the artillery from its first principal position, in an attack? A. The tactics of the infantry should be directed to covering much ground with as few men as possible in extended order, the main bulk of the force being kept in small columns. If there are important points in advance of the position which it appears desirable to possess, they must come under the early fire of both infantry and artillery.

3731. Q. If any high ground comes within reach while the infantry is advancing to the attack, what should be done? A. It should be immediately occupied by the assailants, even though

not in the direct line of the attack. In default of high ground, a church-tower, high-roofed house, or even a tree should be taken possession of if it affords an opportunity of seeing the enemy's disposition.

3732. Q. Where should the commander of the attacking forces post himself during an attack? A. He should, if possible be on an eminence, where he can perceive the principal portion of the ground over which the troops are to work. He should remain at this point, if possible; or, if absenting himself for a time, leave an officer to direct all reports or messengers to the new station.

3733. Q. If no high ground is available for the commander except that which is too far in advance, where should he place himself? A. At the most central and important point, and detach two or more officers, in whom confidence can be placed, to other parts of the field, with directions to keep him constantly informed of what is passing.

3734. Q. What should be done where the headquarters of the commander are liable to change during the action? A. His first position should be given in orders; after that, when making a change, some one should always be left at the first position to direct inquirers.

3735. Q. In what manner should the commander's orders be transmitted, and what should be their character? A. They should be in general harmony with the original plan of attack. They should not descend to details, which are better left to corps commanders; nor should the commander of the troops interfere in the execution of his orders further than to assure himself that they are being carried out.

3736. Q. How may the commander of troops during an attack assure himself that his orders are being carried out? A. By means of constant reports and communications, which must be kept up without interruption during the action between him and his corps or detachment commanders.

#### DELIVERY OF THE ATTACK.

3737. Q. The infantry of the first line, having reached the zone of effective rifle-fire in attack, are how conducted? A. They continue their advance and presently open fire on the points of attack, their firing-line being strengthened as required by its supports. The local reserves of the first line are at such distance that they can either reinforce the original line or be brought up rapidly to support a change of direction, should the best point of attack be only now developed. The other lines of infantry follow the first.

3738. Q. The infantry having engaged the enemy, what should the artillery do regarding the point of attack? A. It should be directed to concentrate its fire upon the intended points of attack, in order to prepare the way for the infantry assault.

3739. Q. In what way may the cavalry be used with the leading infantry in attack if the ground permit? A. The cavalry may support the flanks by advancing under cover in small columns, with strong supports close at hand, losing no opportunity of attacking any advanced troops of the enemy and warding off adverse cavalry attacks in return.

3740. Q. What is the conduct of the cavalry on the infantry flanks during an attack? A. It must be on the watch, not only to protect the flanks of the infantry, but also to seize opportunities of approaching unseen the flanks of the enemy and of throwing them into disorder, or demoralizing them, if not inflicting serious injury. If repulsed and in its turned disordered, it must rally under the protection of the other arms, and again return to exercise similar functions.

3741. Q. As the attack advances, what is done with the artillery? A. A moment may arise when a second position more in advance is necessary for the guns on account of their fire being marked by the infantry. If any of the batteries can be advanced rapidly and placed in position (especially on a flank whence they can add their own fire to that of the advancing troops, which are at the time absorbing the attention of the enemy's infantry), the proximity to the enemy's line must not be too much limited by ordinary rules of caution. It is advisable, however, in assuming this advanced position for artillery that some of the batteries be maintained in reserve in the first position.

3742. Q. What is the conduct of the infantry in the culminating phase of the attack? A. The leading infantry having arrived within short range of the chosen point of attack, the firing-line is finally reinforced by its reserves and rapid fire is commenced, and it is now that magazine-fire will be used. The dispositions having been made under this rapid fire, the firing ceases and the assault is made.

#### RE-FORMATION ON SUCCESS, OR RETIREMENT ON REPULSE.

3743. Q. What should be done by an attacking force, if the attack is successful and the enemy retires? A. The position he occupied is quickly assumed by the artillery, and a heavy fire brought to bear on the retreating troops. The reserve cavalry is brought up and launched in pursuit, accompanied by horse artillery or machine-guns; the commander of the troops should move forward and take his post upon the position lately occupied by the enemy, for further direction of the movements; the infantry should reform the ranks broken by the assault, and then furnish from its freshest troops a force to aid in the pursuit; the field-batteries will also push forward and harass the enemy with their fire.

3744. Q. If the assault of a position has been unsuccessful, how should the retirement of the attacking force be conducted?



A. It must retire, covered, in open ground, by the cavalry and artillery ; in close ground by the least disorganized portion of the infantry, supported by artillery. The latter arm now plays an important part. It must run every risk to enable the retreat to be safely effected until a rear-guard can be organized to protect the movement.

#### THE THREE ARMS IN DEFENSE.

3745. Q. What must a commander of a force of the three arms do, after he has decided to stand on the defensive? A. He should take up the position most suited for his purpose without delay, and it should be such, from a tactical point of view that the different arms could be disposed for defense in the manner most suitable to their action, and there should be facilities for concealing their strength, etc., from the enemy's fire.

3746. Q. What is of the highest importance in selecting a position for defense? A. That the front should be clear for view and fire, as should also be the flanks, unless they rest on impassable obstacles. The extent of the position should not be disproportionate to the strength of the defenders.

3747. Q. What, as a rough rule, might be calculated for the front of a defensive position? A. For each yard of front defended, five men will be required, including all arms and reserves

#### CONDUCT OF THE DEFENSE.

3748. Q. What is the first stage of conduct in the defense of a position? A. If the force be large, it would of course be covered by advanced troops, which will probably involve an affair of outposts. In minor operations the front would be covered by small reconnoitring parties. When the enemy is reported to be advancing, the commander, should the ground admit of it, and render such action safe, might employ part of his artillery in an advanced position, in order to cover the reconnaissance and enable it to be more active and daring, and to check the enemy's attempt to reconnoitre the position. When the advanced troops have to retire, it should usually be by the flank and under cover of the fire of the guns of the main position. The points to be defensively occupied by each fraction of the force would be detailed in orders, and also the relative positions of the reserves. The first stage of the defense would thus comprise the selection and occupation of the position by the defenders, as well as the advanced action, if any, of the artillery and mounted troops.

3749. Q. What would the selection of the ground most suitable for the artillery of the main position in defense depend on? A. The exact trace of the shooting line for the infantry. The guns should, if possible, be so placed as to bring the enemy's columns under fire at long range, and hence they ought to command

every distant approach. They should be able to pour a concentrated fire upon the probable positions which will be assumed by the attacking artillery, and be stationed so as to sweep the ground in front of the position from the earliest to the latest moment of the attack. The defense of the flanks in the case of large forces must be specially provided for.

3750. Q. What should be the general distribution of the infantry? A. The general distribution of the infantry should be in three lines. The *first*, or line of defense, is divided into three parts—a firing-line, supports, and reserves; the *second* and *third* lines are held back, either for reserve purposes, or for offensive as well as defensive tactics.

3751. Q. If there is time sufficient, what auxiliary means of defense should be added to the position to be defended? A. Some sort of intrenchment should always be prepared for the batteries, and shelter-trenches for the infantry in the firing- and supporting-lines. But the newly-broken earth should be concealed, if possible, by being covered with dead leaves or green brush if available. These prepared places, however, should not be occupied by guns or troops until the proper moment for action arrives.

3752. Q. In making arrangements for the defensive position of batteries, what must be considered. A. That it is of the utmost importance to secure the artillery of the main position against the fire of the enemy's advanced skirmishers, or marksmen; and, with this in view, the batteries ought to be covered in their immediate front by a line of extended riflemen, placed either in trenches or pits, or behind natural cover, some 300 to 500 yards in advance of the guns which they defend. These would remain as long as possible in position, and only retire when driven back by the overwhelming advance of the assailants.

3753. Q. After all dispositions as regards ground and intrenchments have been made, what portion of the troops as defenders should first take position, and what should be the line of conduct? A. The artillery would first take post, but not too soon. They should not fire on small and scattered detachments, as it would reveal their position; but, when the heads of the enemy's columns can be discerned and are within range, so that they can be forced to deploy, the guns may move into position. If the advancing infantry are covered in their preliminary movements, the guns of the main position should not be brought up until the attacking artillery deploys at its first principal position.

3754. Q. At what period of the first stage of defending a position should the infantry take post? A. With the exception of the skirmishers in front of the guns and detachments holding advanced posts, the infantry should be kept under cover in rear of the position, until the enemy comes within effective rifle-range.

3755. Q. How should the defense occupy certain portions of

his position which seem to possess tactical advantages? A. These parts of the position should be occupied in force, with supports in close proximity, while still preserving the general line. The support should be prepared to resist advance by rapid reinforcement at any of the possible points of approach.

3756. Q. What is considered to be the second stage in the defense of a position by the three arms combined? A. From the time the main batteries have opened on the heads of the attacking column until the enemy arrives within the third zone of fire.

3757. Q. What advantage have the defenders over the assailants in the long-range fire of the guns? A. If the commander of the defense has attended to his necessary duties, he would not only have the advantage of being intrenched, but would know accurately the ranges to the various points which must be occupied by the enemy in his advance.

3758. Q. How long should the defender use his guns against the attacking artillery in its first position? A. Until the attacking infantry has passed the first fighting-position of its guns, and is pushing into the second zone. From this time the guns of the defense are directed upon the attacking infantry.

3759. Q. When may the advanced posts of the defense be expected to be forced back, and what should be done when that occurs? A. Almost any time after the enemy has passed into the second zone, upon which the infantry of the first line of the defense should be ordered into position and the firing-line may fire platoon or section-volleys to cover the withdrawal of the advanced posts. The machine-guns may now be brought up and placed on the flanks of the firing-line, or in the interval between battalions.

3760. Q. What should be done upon casualties occurring in the firing-line of the defenders? A. Reinforcements from the supporting-line must immediately fill up the gaps, as it is a matter of the first importance that the firing-line be always kept up to its maximum strength.

3761. Q. When may the third stage in an action be said to commence and at that time what should be the conduct of the defense? A. The third stage begins when the enemy enters the limits of the third zone, by which time the defense has been required to show its position, and the enemy commences his dispositions for the real attack, which the defending commander must by every means in his power endeavor to discover the point of. As the supports and reserves of the assailing infantry come clearly into view they should receive the concentrated fire of part of the artillery of the defense, as well as volleys from the firing-line.

3762. Q. The real points menaced by the attack having been made apparent by the nearer approach of the enemy within the

third zone, what will the commander of the defense do? A. He reinforces the menaced points so as to meet the assailant with a superior infantry fire, and the artillery of the defense is now all directed at the infantry firing-line, which the assailants have also reinforced. The second line is brought nearer to the first line.

3763. Q. Should a counter-attack be projected, when should it take place, and what possible action of the enemy should be provided for? A. A counter-attack should be made during the third stage, unless it is to be delayed until after the assault. At this time also, resistance to a flank movement of the attacking troops would also now have to be made, to meet which a special reserve is sometimes held, or else a portion of the second or third lines are employed.

3764. Q. By what portion of the defense would a counter-attack be made? A. It would usually be made by the third line, and part of the cavalry and horse artillery employed in support of it.

3765. Q. What should the cavalry of the defense do during the third stage of action? A. It should generally move forward to seek for opportunities of throwing the flanks of the attacking infantry into disorder, or of taking guns too rashly advanced, or of counteracting the movements of the enemy's cavalry.

3766. Q. If the assailants are not beaten back by the time they reach assaulting distance, what is then done by the defense? A. The first line of the defense prepares for a final effort, and being fully reinforced by its reserves, commences independent fire; the machine-guns join, and every gun of the batteries also is served as rapidly as possible, case-shot and reversed shrapnel being used; if the infantry have magazines to their rifles, they must now be used.

3767. Q. What will be done by the defense if the assailants prepare to charge the position? A. The second line of the defense fixes bayonets, and moves up to the firing-line to resist the assault. Should the assailants retire, the guns of the position must continue to fire on them until masked by the interposing troops sent forward in pursuit.

3768. Q. If the defenders of a position are compelled to fall back, what is the conduct of the defense? A. The guns must cover the movement, and the third line is utilized at the same time to enable the first and second lines to withdraw. In an open country, the cavalry also, being comparatively fresh, would aid also in checking the pursuit; in a close country the infantry and artillery must be depended on.

#### THE ATTACK AND DEFENSE OF LOCALITIES.

3769. Q. What is the rule in modern campaigns regarding the tactical occupation of special localities? A. It is to occupy hamlets, farm-houses, woods, isolated hills, or even the smallest acci-

dent of ground, the possession of which may often assure success to the side which can hold them. The action of a force detached from the main army, is commonly connected with the seizing or holding of such positions.

3770. Q. What would be the best formation for an infantry attack of isolated positions in connection with a battle-field? A. It would be in small columns at considerable intervals, which could profit by the ground and advance without extending, close up to the point of attack. The leading supports should be close to the front. The artillery would, as in the attack of a position, first prepare the way for the infantry at long range; and then, if possible, move up to telling distance, to coöperate in the final assault.

3771. Q. How should the defense of an isolated position be arranged? A. Strong points, which the enemy cannot pass without taking, must be looked for. These should be occupied by the defenders, and the enemy forced to local attack thereon by strong reserves so posted as to prevent a turning movement. All approaches should be brought under concentrated fire, and if the defense is to be made a determined one, an inner line or citadel should be fixed upon for final resistance. Guns must not be shut up in any inclosure; they should rather be on the flanks with temporary protection. Under ordinary conditions, as in larger operations, the defenders should seize upon any opportunity for making a counter-attack.

#### REAR-GUARDS.

[Under this head candidates may elect to be examined in Wagner.]

3772. Q. What is the duty of a rear-guard in a forward march? A. It is principally of a police character, remaining until the last of the *impedimenta* have left camp, and then marching in the wake of the other troops. It should be of sufficient strength to ward off any desultory attacks on the baggage.

3773. Q. What is the main duty of a rear-guard in retreat? A. Its mission is to retard the pursuit of the enemy, and to interpose between him and the main body on the march. The very best officers and the freshest troops should be selected for this purpose.

3774. Q. With reference to the close of an engagement with the enemy, when is a rear-guard formed? A. It can never be organized, nor can its duties ever commence until after the first pause which separates the combatants at the conclusion of an action.

3775. Q. What should be the strength of a rear-guard? A. It should take the same proportion of the covering detachments as would be allotted to the advance-guard in a forward march.

This proportion should commonly be about one sixth of the whole marching strength. In exceptional cases, as when protecting the rear of a beaten force against a pressing pursuit, it might amount to one fourth or even one third of the whole.

3776. Q. Why should such a strong force as one fourth or one third of the whole command be used? A. To enable it to withstand the assaults of the enemy and prevent the rear-guard from being constantly thrown back on the main column, causing it to become disordered. The mere knowledge of the fact that they are in retreat is demoralizing in itself to troops; but should the rear-guard not be strong enough to enable the column to retire, the feeling of depression will increase, the retreat will turn to a rout, and disaster will result.

3777. Q. What should a skilful rear-guard commander endeavor to obtain? A. Even small advantages over the enemy, in order to encourage his men and maintain their *morale*. With this view, it is desirable that the extreme rear and flanking detachments should be sufficiently strong to take all possible advantage of the enemy's imprudence.

3778. Q. What distance should be interposed between the main body and the rear-guard? A. This must depend upon circumstances. The former, as is natural in retreat, or in a strategic march to elude the enemy, proceeds as fast as is convenient in the desired direction, and as the rear-guard has to interpose between the main body and the enemy, it happens that the distance in two or more cases may vary considerably; but under ordinary conditions, the distances laid down for the advanced-guard in a forward march would be approximately suitable for the rear-guard in retreat.

3779. Q. Why is it not necessary for a rear-guard to reconnoitre in advance of its march, while on the retreat? A. Because it is the duty of the commander of the main body which precedes it to send back all desirable information concerning roads, bridges, fords, and positions suitable for making a stand.

3780. Q. Where should a rear-guard, marching in retreat, have reconnoitring parties? A. On the flanks; if not, its protective character as a guard to the rear of its own main column ceases to have effect. The parties sent out on this duty, should, in all possible cases, be composed of cavalry.

3781. Q. Mention some points of resemblance and some of difference between rear and advanced-guards. A. The principles of formation are identical with an advanced-guard reversed; and the same rules generally guide both, with this difference, that the rear-guard usually retires before the enemy, while the advanced-guard pushes against him.

3782. Q. What would the general disposition be of a rear-guard? A. The whole of the mounted troops, with their machine-guns, should protect the rear, either forming their own supports,

or supported by a force of infantry. The artillery moves at the rear of the reserve, and then the infantry still nearer to the main column. If the country admits of it, the reserve in a strong rear-guard may march with advantage in two parallel columns, not too far apart.

3783. Q. What particular instructions should always be given a rear-guard? A. As to the degree of resistance to be offered to the enemy and the extent to which reconnoitring on the flanks is to be carried.

3784. Q. How might the extreme rear be formed in a fairly open country by a rear-guard marching in retreat? A. When the pursuit is not immediate, by groups of cavalry, moving in a line thrown back at each end towards the flankers, until it assumes the semicircular form more marked than it would in the advance.

3785. Q. If the pursuit of a rear-guard by the enemy is active, and an attack imminent, what should the rear-guard do? A. It must manœuvre, and the kind of manœuvring must depend on the nature of the country and composition of the guard.

3786. Q. What are the special uses of the different arms composing a rear-guard in an ordinary country? A. In an ordinary country, all arms are necessary, but cavalry are specially required, not only for reconnaissance to the flanks, but to check the enemy's cavalry. Horse-artillery should be used with the cavalry. Mounted infantry, with machine-guns would be extremely useful in delaying the enemy's advancing columns. But infantry is indispensable under all circumstances in order to make a stand at suitable positions for defense.

3787. Q. What should be the composition of a rear-guard, if the force is of any magnitude? A. It should be composed of the three arms, in proportions suited to the ground to be passed over. Cavalry to meet and ward off the enemy's light-horse and guns; artillery to take up favorable positions in retreat to bear on pursuing columns; infantry to bear the brunt of the enemy's attack at chosen points of resistance.

3788. Q. Why is artillery especially useful as part of a rear-guard? A. Because, if the guns are used with skill in a retreat, they can often save the deployment of the infantry, by obliging the enemy to lose time by halting and deploying for attack.

3789. Q. Generally speaking, what is the great object of a rear-guard? A. To keep back the enemy, without compromising the safety or delaying the retreat of the main body.

3790. Q. What is the best general method of keeping back an enemy in pursuit of a retreating force? A. By continually offering to fight and yet not fighting; occupying such natural positions as will cause the enemy not only to deploy but even to attack, and then getting safely away without serious fighting.

3791. Q. What may be accomplished by a rear-guard continu-

ally offering to fight? A. It delays the enemy without much loss, and perhaps prepares the way for a successful offensive return, should the defective dispositions of the enemy, or his careless manner of pursuit, afford an opportunity.

3792. Q. Why should any attempt at the offensive by a rear-guard be made with great care and judgment? A. Because a commander should never forget that he cannot stop long to fight, every moment that elapses bringing the foe assistance, while it separates the rear-guard from its friends.

3793. Q. Why should the temptation to pursue a repulsed enemy by a rear-guard be resisted? A. Because it would result in too great an interval being left between the rear-guard and the main column, the latter always continuing its march in retreat.

3794. Q. If seriously committed to an engagement, how should the troops of a rear-guard withdraw? A. Only by alternate echelons.

3795. Q. What expedients may be used for delaying a pursuing party in addition to the use of the troops? A. By breaking up or barricading roads and destroying bridges.

3796. Q. Mention the methods of placing obstructions in the way of a pursuing force. A. By loosening the planks of a wooden bridge so that the troops that cross last can easily remove them and throw them in the river, even in the face of the enemy; gates and narrow roads can be barricaded with carts loaded with stones or earth, one wheel being removed from each cart before being placed in position; fords are made difficult to pass by placing old farming implements, such as harrows, ploughs, etc., in the line of crossing.

3797. Q. In what manner does a rear-guard possess superiority over its pursuers, if of equal strength? A. In taking up a position of even small natural strength—such positions as are formed by rivers, heights and gullies, or other accidents of ground.

3798. Q. Compare the advantages and disadvantages of a rear-guard in retreat with those of an advance-guard in a forward movement. A. The knowledge which it has of the ground is much to the advantage of the rear-guard, as it can decide at what points to make a stand. The advance-guard in the forward march can push on with the confidence of knowing its supports to be approaching from the rear in any required force; the rear-guard, on the other hand, cannot but feel that the longer it is delayed the farther it gets from the main body, and has to consider a danger which does not exist for the advance-guard—that of being cut off from its column.

3799. Q. What is the greatest of all dangers against which the commander of a rear-guard must provide? A. He must not forget that he may be pursued by a column marching on a road to his flank in addition to that immediately behind him.



3800. Q. If the position to be taken up by the rear-guard be an important one, how will the reserve be governed, and what will the enemy probably endeavor to do? A. The reserve will, after passing the ground, halt and remain in such proximity thereto as may enable it to support the remainder of the force so long as required. The enemy will probably endeavor, in such an event, by every means in his power to push on by the flanks and forestall his opponent in possession of the ground. He can lose little by the attempt, and if at all successful, the least evil that can result to the rear-guard will be that it must continue its retreat in all haste, for fear of the greater evil of being cut off from its main body.

3801. Q. What might be adopted as a protection against the turning of a position to be taken up by a rear-guard? A. It might differ from that of an advanced-guard by having an intermediate body marching about half-way between the reserve and the main column, which could push on to hold any ground of tactical importance until the reserve reaches it; or, the main retreating column might leave troops behind it to hold the tactical point until the intermediate detachment arrives; and to carry out this additional precautionary movement completely, this force, if mixed, should be provided with artillery as that has a special effect in deceiving the enemy regarding the strength of the troops.

3802. Q. If the pursuit of a rear-guard, which has been actively carried on up to a certain point, suddenly appears to cease, what should be done? A. The commander should send out strong cavalry patrols to ascertain the cause—as to whether the enemy has stopped his pursuit on the main route, or has taken a different direction and is still advancing. In the latter case, active reconnaissance by cavalry patrols should immediately be undertaken by the rear-guard, and the main column advised of the route taken by the enemy, that it may send out flanking detachments to feel for him.

3803. Q. What precautions are necessary by a column of troops in retreating through a defile? A. The heights on each side should be held by troops from the main body until relieved by the infantry of the rear-guard. The entrance to the defile must then be defended until the enemy, forced to deploy, begins to assault the flanks on either side. The moment for retreat having arrived, the guns fire a last round of shrapnel and disappear through the defile at a rapid pace, followed by the cavalry and lastly by the infantry, the whole being covered by the fire of the flanking parties on the heights, which are the last to fall back.

3804. Q. What reception might be given an enemy in pursuit of a rear-guard on debouching from a defile? Guns may be so placed as to enfilade completely the defile, or that portion of it near the farther entrance and cavalry held in readiness, if the ground admits, to charge the enemy's flanks as he comes out of the defile,



before he has time to form line. The infantry, in part, dispute possession of the heights commanding the near end of the defile, while the remainder bring a heavy fire to bear on the heads of the enemy's columns as they come in view.

3805. Q. What measures would be adopted by an army retiring by more than one road running parallel, or nearly so, to each other? A. Usually, there would be a rear-guard on each road under a separate commander, the rearmost groups being continued across the whole rear, and flankers only on the outer ranks of the outer columns. The whole of these rear-guards would be included in one high command.

#### CONVOYS.

3806. Q. What is the object of a convoy? A. During military operations, its object is to transport under escort all *matériel* required in war, such as ammunition, treasure, provisions, baggage and equipment, as well as wounded men, sick and prisoners of war.

3807. Q. What means of transportation are generally used on interior lines, and why? A. Railways, in civilized countries, on account of the more rapid means of communication.

3808. Q. What other means of transportation are used in military operations? A. Road and water, which are often required to supplement the railway transport, or to connect the various links. In lands less favored it is necessary to move all supplies by vehicle, pack-animal or boat, and sometimes by human labor.

3809. Q. What is regarded as the duty of the first line of transport? A. To convey supplies from the advanced magazine to the divisional headquarters of the fighting portion of the troops; from this point or points the regimental transport, if sufficient for the purpose, takes on the supplies as required to the various corps at the extreme front.

3810. Q. What is considered the second line of transport? A. All other means of transportation not mentioned as belonging to the first line.

3811. Q. What is the military organization in the first line of transportation? A. It must be a strictly military organization, with training for the transport corps of the army. This is indispensable.

3812. Q. What is the military organization in the second line of transportation? A. Although full military organization may be wanting, the officers and conductors should be military, and as far as possible a system in uniformity with that of the trained corps in front should be introduced.

3813. Q. Under whom are those portions of the transport which march with the troops placed? A. Under the order of a baggage-master (wagon-master in the U. S. service) one to

each brigade or division, who exercise a general control of the trains pertaining to their particular troops. In the U. S. service, where bodies of troops move together, these trains are organized with brigade, division and corps quartermasters in charge, the corps train acting independently under the orders of the corps quartermaster, with the other quartermasters as assistants and a wagon-master to each brigade.

3814. Q. When transports do not accompany troops, but move in independent bodies, how are the convoys formed? A. They have a sufficient escort to protect them, in case of an attack, under charge of an officer entitled to command troops, whose orders all those marching with the convoy must obey.

3815. Q. Who is charged with the organization of the transport service attached to a convoy by road, and for what is he responsible? A. The senior officer is charged with everything connected with the men, horses and vehicles composing the transport. He is responsible for the completeness of the equipment and for the loading being correctly effected, as well as for the animals being properly cared for, and the drivers kept under strict discipline. All arrangements, however, as regards orders of march, of the carriages and *matériel* must be made by the transport officer with due reference to the commander of the convoy, in order to insure the proper disposal of the escort.

3816. Q. What should the commander of a convoy by road, on being named for the duty, consider, with the aid of his map? A. 1. The distance and route which the convoy has to travel; 2. The position and strength of the enemy, and the quarter from which attack is to be apprehended; 3. The nature of the country, roads, etc., to be passed over; 4. The number of carriages and beasts of burden forming the convoy, with the nature of their loads; 5. The number and description of the troops detached for escort duty.

3817. Q. Why should the distance and route be known by the officer in charge of a transport by road? A. In order to arrange the various details of the march, especially as regards the places where halts are to be made.

3818. Q. Why should the officer in charge of a transport by road be informed of the position and strength of the enemy? A. Because the advance of the convoy should be conducted with due regard to the possibility of attack, the precautions being redoubled when his close proximity renders attack probable.

3819. Q. Why should the nature of the country, roads, etc., be made known to the officer in charge of a transport by road? A. In order to decide where the enemy would be likely to establish ambuscades or to attack in the open. The width and character of the roads are important considerations, as they will regulate, to a certain extent, the order and rate of march of the convoy.

3820. Q. Upon what general principles should a convoy be organized for the march? A. All the wagons should be told off into subdivisions of suitable strength (25 in the U. S. Army, under a wagon-master). These form the tactical unit of the convoy.

3821. Q. How should the line of march of a convoy be formed, as a rule, in a close country, including cultivated land, etc., impassable except on the roads? A. With a frontage of one vehicle only, unless the roads are wide enough to admit of two abreast, in addition to space enough to allow of combatant troops passing freely.

3822. Q. How may the line of march be formed in an open or uncultivated country by a convoy? A. The wagons may march with as broad a frontage as circumstances will permit.

3823. Q. If there be pack or led horses with the convoy how should they be placed? A. If the country permits it, they march on one or both flanks of the convoy, leaving the road clear for the wagons. If placed behind the carriages, they suffer from the dust raised by the column in dry weather, and in wet weather from the roads being cut up by the wheel of the vehicles?

3824. Q. How should an escort to a convoy of a mixed force be disposed as a rule? A. By forming, first, advanced scouting parties of cavalry, and as reconnaissance, not resistance, being their business, they need not be strong. They patrol to the front and to the flanks, extending in an open country to a distance of from 3 to 5 miles. Second. Advance-guard preceeding the convoy well to the front, having its point at least one mile from the first carriage. This would usually consist of infantry, with some cavalry to reconnoitre. Third. Flank-guards on exposed flanks, which would march on either side of the convoy, in an open country, not less than half a mile from the main route. If only one flank is dangerous, one flank-guard will be sufficient; if the country be close, the flank-guard might be able to march on a parallel road, keeping roughly abreast of the convoy; the flank-guards in a large convoy would be composed of cavalry, mounted infantry, and guns. Fourth. Main body accompanying the convoy, which, composed of infantry, with artillery added in a strong escort, would march near the centre of the convoy, accompanied by the commander of the escort. The main body would usually furnish three small detachments, one for the front, another for the centre, and another for the rear of the convoy; they would always closely accompany the wagons. A few pioneers should accompany the advance-guard to repair bridges or roadways.

3825. Q. What is the duty of the main body of an escort to a convoy when any portion of the convoy is threatened? A. To at once move to the threatened portion. If a bridge, defile, or ford is about to be passed, if the rear appears secure, the main body or a portion of it, should push on and march in front of the con-

voy, next after the advance-guard. If the rear is threatened, it should of course fall back, and follow the convoy in front of the rear-guard.

3826. Q. What has a convoy most to fear on the road? A. An attack from cavalry with guns.

3827. Q. What precautions should be adopted to prevent the convoy coming under the guns of an attacking force? A. The advanced cavalry should give information to the advance-guard or to the flank-guard, as the case may be, of the enemy's presence; and the body so informed should then ward off the attack at such a distance from the convoy as to prevent the carriages from coming under hostile fire, and the main body must not hesitate to support the action of the party attacked—even to advance and give the enemy combat on some distant position, should such be well suited to cover the march of the convoy and save it from the dire effects of long-range fire.

3828. Q. In the event of successfully repulsing an attack upon a convoy, should the escort pursue the enemy? A. Under no circumstances should it do so; the commander of the escort must remember that the fate of the main body will probably decide that of the convoy.

3829. Q. What speed may be expected of a convoy on the road? A. The pace, including short halts, will rarely exceed two miles per hour. If the roads are heavy and the country hilly, no estimate whatever can be given, as hours may be consumed in advancing a single mile.

3830. Q. What kind of halts should be made by a road-convoy, and when should they be made? A. Short halts and long halts; the former should take place every hour or half hour, according to requirements; they are made in open ground and near water. The long halts are for the purpose of resting and of providing refreshment for men and animals; they should only be made in positions well explored in advance.

3831. Q. How may the wagons of a convoy be parked? A. If the enemy is at a distance they may be parked by being drawn up in any open space in column of subdivisions, the wagons of each subdivision being axle-tree to axle-tree and a distance of twenty yards between the lines. The animals may either be fed as they stand in the teams, or they may be taken out and picketed in front of the wagons. If, on the other hand, the enemy is near, and there is danger of attack, the best formation is that which will allow of the escort in immediate charge of the wagons and drivers defending themselves and the horses to the best advantage. The system of *coralling* is the most frequent used in the U. S. Army. This is done by forming a circle or an ellipse, the animals all being turned towards the interior, each wagon being run up close to the other in echelon, thus forming a barricade, which can be used for defensive purposes as well as a protection to the animals.

## CONVOY OF PRISONERS.

3832. Q. What must the commander of a convoy of prisoners consider? A. The certain existence of a hostile feeling amongst them, and to guard against internal revolt as well as against external attack. He should speak the language of the prisoners, or else an interpreter should accompany him.

3833. Q. What should the commander of a convoy of prisoners do before starting out? A. Make out a list of the prisoners turned over to him, and tell them off into squads or companies under their own officers and non-commissioned officers.

3834. Q. What should the prisoners under convoy be told before starting? A. That no communication whatever will be permitted between them and the people while passing through the enemy's country; that they will have their wants as regards food, etc., attended to; that those who attempt to escape will be shot, and that in the event of any hostile act on their part the guard will fire upon them without hesitation.

3835. Q. Where should prisoners under convoy be placed at night? A. In walled inclosures, or in any large buildings that may be at hand, and a cordon of sentries posted around them, with orders to shoot any one attempting to run the gauntlet and escape.

3836. Q. What should be the conduct of the commander of a convoy toward prisoners? A. He cannot be too kind or considerate, but he must also be firm and determined in putting down all attempts on their part to resist or escape.

3837. Q. How should the commander of a convoy of prisoners dispose of his escort? A. He should make the usual disposition of the escort on the march to secure the convoy from attack, and should detail a special guard each day to immediate charge of the prisoners.

## PART XI.

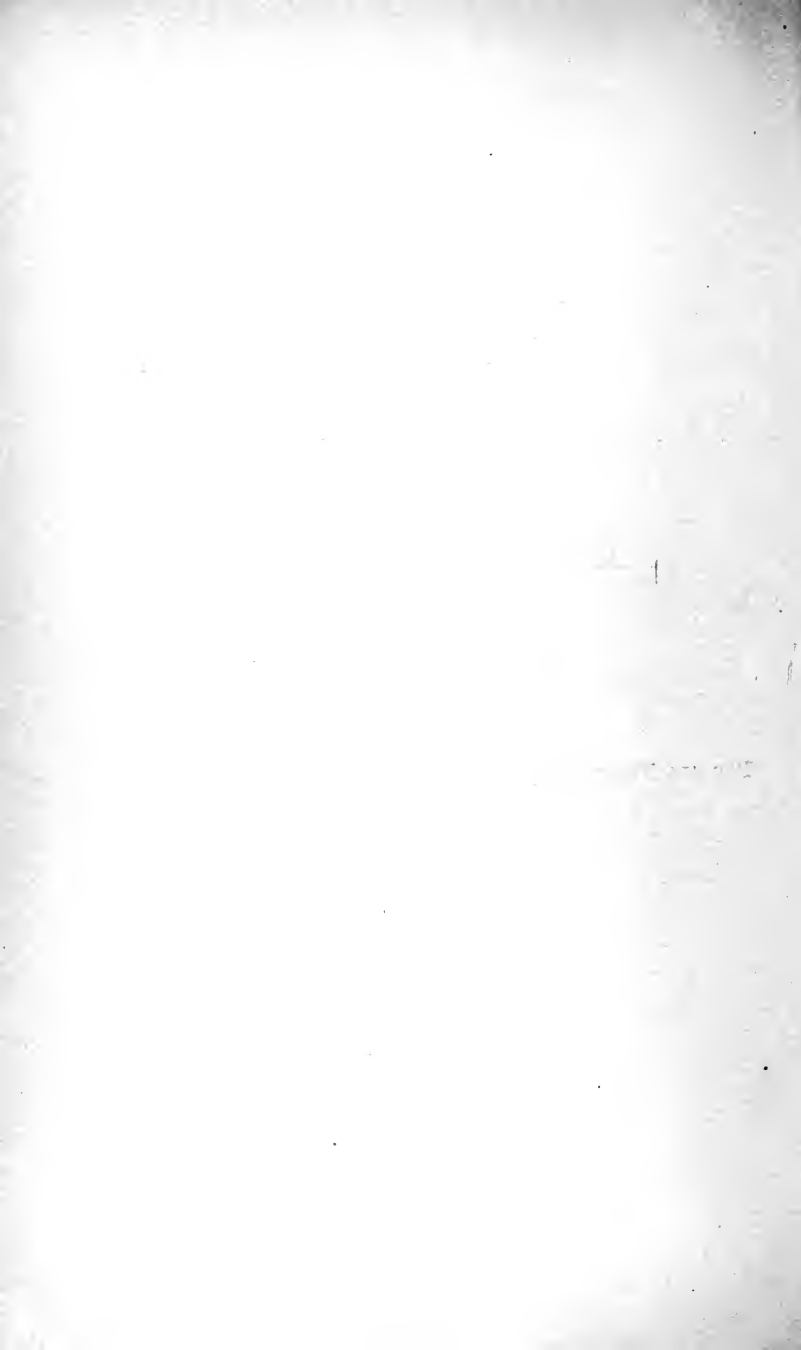
### *MILITARY TOPOGRAPHY.*

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TEXT-BOOK:—*Richards*'.

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FOR ALL FIRST LIEUTENANTS OF THE LINE—Nos. 3838-3939.





## PART XI.

### MILITARY TOPOGRAPHY.

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#### MILITARY TOPOGRAPHY.

##### THE CONSTRUCTION OF SCALES.

3838. Q. What is the object of surveying as applied to the Art of War? A. To explain, by plan and by report, the tactical capabilities of ground in anticipation of some military operation, or to illustrate operations that have taken place.

3839. Q. How should a military sketch be made in order to render it valuable? A. With rapidity, combined with a fair degree of accuracy.

3840. Q. Is draughtmanship an essential qualification in the military topographer? A. No: mere draughtmanship, although a valuable aid to the topographer, is of minor importance in the present system of representing ground.

3841. Q. Define the "scale" of a plan, and illustrate by an example. A. The "scale" of a plan is the proportion the latter bears to the object that it represents. [*Example.*—For instance, a scale of one inch to a mile implies that every mile on the ground is represented by an inch on the plan.]

3842. Q. What method is in general use by all countries of representing the scales of their military plans, and what is the advantage of this method? A. The method by what is known as the "Representative Fraction." The advantage of this method is that if the Representative Fraction is marked on a sketch, the scale can be understood and the sketch used by anyone, even though it be a foreign one; but without the Representative Fraction it might be useless. For instance, an officer might be required to read distances on a sketch whose scale was laid off in Russian *versts*. If you did not happen to know how much a *verst* is, he would beat a loss, but if the sketch had on it the Representative Fraction  $\frac{1}{105600}$ , he would at once know that the scale was 6 inches to a mile.

3843. Q. Define the Representative Fraction, and explain its significance. A. A Representative Fraction is a fraction of which

the numerator bears the same proportion to the denominator that the map, or any distance on it, bears to the ground that it represents. Thus, if the R. F. of a map is  $\frac{1}{63360}$ , it means that 1 inch on the map represents 63360 inches (i.e., one mile) of the ground. The numerator of the R. F. must always be 1, and this 1 is always taken to mean 1 inch; therefore the denominator must, of course, be invariably expressed in inches.

3844. Q. The scale of a map is 3 inches to a mile. Give its R.F.

$$\text{A.—R. F.} = \frac{3 \text{ inches}}{1 \text{ mile}} = \frac{3}{1 \times 1760 \times 3 \times 12} = \frac{1}{21120}$$

3845. Q. You measure the distance between two villages, and find it to be 1500 yards; on a map of the ground they are shown exactly 4.3 inches apart. What is the R. F. of the map? A. :

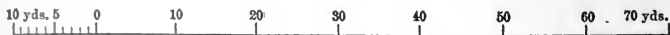
$$\text{R. F.} = \frac{4.3 \text{ inches}}{1500 \text{ yards}} = \frac{4.3}{1500 \times 3 \times 12} = \frac{4.3}{54000} = \frac{1}{125581}$$

3846. Q. Explain the method and draw a scale of which the primary divisions are tens and the secondary divisions units of yards, R. F.  $\frac{1}{468}$ . A. Here the first thing to do is to decide how many yards will give a line about 6 inches long (6 inches being a convenient and usual length for a scale, and therefore a good guide to adhere to). We see at once from the R. F. that 468 inches, or 13 yards, are represented by 1 inch; therefore, clearly, 78 yards will go to 6 inches. But the scale must show complete divisions of, in this case, tens of yards. So we fix on 80 yards as a suitable length, as it complies with this condition, and we know it will give a line *about* 6 inches long. Now, we must find the *exact* length of the line required. The following proportion gives it :

$$468 \text{ inches} : 80 \times 3 \times 12 \text{ inches.} :: 1 \text{ inch} : x \text{ inches.}$$

from which  $x = 6.15$  inches.

To draw the scale : Take a line 6.15 inches long, divide it into 8 equal parts ; each will represent 10 yards. Divide the left part into 10 equal parts ; each will represent 1 yard. Thus :



Scale of Yards, R. F.  $\frac{1}{468}$ .

3847. Q. Construct comparative scales suitable for sketching on horseback, having ascertained that in a measured distance of 300 yards your horse takes 120 strides at a canter, 270 steps at a walk, and that in trotting that distance you rise in the saddle 90 times :

R. F.,  $\frac{1}{12000}$ . A. Here, three scales at least are required and a fourth to show yards would, of course, be added in practice. First take the strides cantering. We are told that 120 strides = 300 yards,  $\therefore 1 \text{ stride} = \frac{300}{120}$ . Upon comparing the proportion revealed by the R. F. with the proportion that a stride bears to a yard, we see at once that 800 strides will be a proper number to take for our scale—e.g.,—1 stride =  $\frac{300}{120}$  yards. From the R. F., 12,000 inches = 333 $\frac{1}{3}$  yards, are represented by 1 inch; therefore,

$\frac{333\frac{1}{3}}{\frac{300}{120}}$  yards = 133 $\frac{1}{3}$  yards = number of strides represented by 1 inch. But our line must be about 6 inches long, therefore multiplying 133 $\frac{1}{3}$  by 6 we have 800, the right number to take. Now to get the length of line to represent 800 strides, we have :

$$12,000 \text{ inches} : 800 \times \frac{300}{120} \times 3 \times 12 \text{ inches} :: 1 \text{ inch} : x \text{ inches}$$

$$x = 6 \text{ inches.} \quad \bullet$$

Now for the steps at a walk : 270 steps = 300 yards  $\therefore 1 \text{ step} = \frac{300}{270}$  yards. Following the same course of reasoning as above, we find that 1800 steps will be the right number to take, and the length of line representing 1800 steps is found from the following proportion :

$$12,000 \text{ inches} : 1800 \times \frac{300}{270} \times 3 \times 12 \text{ inches} :: 1 \text{ inch} : x \text{ inches.}$$

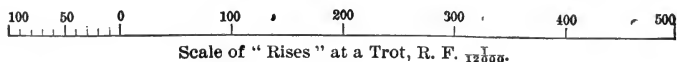
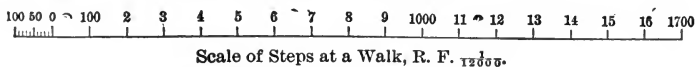
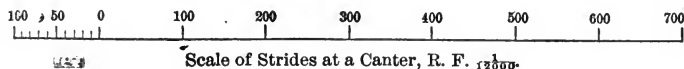
$$x = 6 \text{ inches.}$$

Finally, for the rises at a trot : 90 rises = 300 yards  $\therefore 1 \text{ rise} = \frac{300}{90}$  yards. Therefore, 600 rises will be the right number to take, and the length of line representing is found by the following proportion :

$$12,000 \text{ inches} : 600 \times \frac{300}{90} \times 3 \times 12 \text{ inches} :: 1 \text{ inch} : x \text{ inches.}$$

$$x = 6 \text{ inches.}$$

The scales should be all drawn and figured as shown below.



## COPYING, REDUCING, AND ENLARGING PLANS.

3848. Q. How should a plan be copied generally? A. Plans, to be simply copied without reduction or enlargement, may be simply traced on transparent paper, or what is known as tracing-linen, from the original; or a piece of carbon-paper being placed between the original and the copy, and both being firmly fastened down by drawing-pins; the original may be transferred by following the lines with a pointed instrument.

3849. Q. What is the quickest and best way of copying when the original is on thin paper? A. Pin the copy on it, and trace it through against a window-pane.

3850. Q. What are the methods of making an enlargement or reduction of a plan? A. By photography; by means of an instrument called the "pantagraph"; or, by the following: First, draw, upon the original, squares of any convenient size, arbitrarily selected; then prepare the paper for the copy with squares in the required proportion to those on the original; the original can then be easily copied by eye, objects being placed in the copy in the same positions that they occupy relatively in the squares on the original.

3851. Q. The scale of a map is  $\frac{1}{10560}$ . A copy is wanted on a scale of 5 inches to a mile. Explain how you will make it. A. In this case the copy is to be on a smaller scale than the original. Two-inch squares are decided on for the original, and the size of the squares for the copy are calculated thus:

$\frac{1}{10560} : \frac{1}{12672}$  (i.e., 5 inches to mile) :: 2-inch squares :  $x$  inch squares, from which  $x = 1\frac{2}{3}$  inches.

## THE CONVENTIONAL SIGNS.

3852. Q. What is the meaning of the term "conventional sign"? A. A conventional sign is a particular way of representing on a sketch a natural feature and object, such as a road, railroad, telegraph-line, troops, etc.

3853. Q. Illustrate by drawings the following conventional signs: Battery of field-artillery; battalion of infantry; squadron of cavalry; a road inclosed by a fence; a road uninclosed by a fence; a railroad, single and double tracked; a telegraph-line; a marsh; cultivated ground; a wood; buildings. A. The conventional signs are represented in the frontispiece plate in the "Text-book of Military Topography," edition of 1888.

3854. Q. What two styles *only* of printing (i.e., lettering) are now used in military sketches? A. Italics for all ordinary detail and description; upright block-printing for titles.

## TERMS USED IN DESCRIBING HILLS.

3855. Q. Define the following terms : 1. Watershed. 2. Water-course. 3. Col. 4. Ravine. 5. Spur. 6. Underfeatures. A. 1. The line which defines the highest part of any feature or chain of hills. The ridge of roof illustrates this term. 2. The line defining the lowest part of a valley, whether occupied by a stream or not. 3. The neck or saddle that connects adjacent heights. 4. A narrow valley with steep sides. 5. A prominent feature projecting from high ground. 6. The minor features which spring from main features.

## THE REPRESENTATION OF HILLS.

3856. Q. What was the old method of representing sloping ground? Explain it briefly. A. By shading, produced by short strokes called *hâchures*, the thickness and number of which were regulated by a "scale of shade," according to the degree of slope. Each stroke, or *hâchure*, is horizontal; therefore the greatest slope at any place is a line intersecting the *hâchures* perpendicularly. The "scale of shade" is the key to the expression of such a drawing as regards steepness of ground.

3857. Q. What is the present system of representing slopes and hill-features? A. By continuous contours, sometimes supplemented by lead-shading.

3858. Q. Define a contour. How do the vertical intervals between contours compare with each other? A. A contour is the line of intersection of a hill by a horizontal plane. In a survey, contours are placed at equal vertical intervals. For instance, the line defined by the edge of the sea on a shelving beach might be regarded as a contour, and others might be traced at, say, 5 feet intervals by marking the edge of the water each time its surface had fallen that quantity.

## THE SCALE OF HORIZONTAL EQUIVALENTS.

3859. Q. In military topography, what does the term "Horizontal Equivalent" imply? A. It implies the horizontal distance (expressed in yards) in which a given difference of level will occur at a given degree of slope. For example, you ascend a slope of  $5^\circ$  until you are 20 feet vertically above your starting-point. You will find that your horizontal distance from your starting-point is 76.4 yards. In other words, the "Horizontal Equivalent" (H. E.) of  $5^\circ$  (the vertical interval (V. I.) being 20 feet), is 76.4 yards.

3860. Q. Explain the method of calculating the Horizontal Equivalents, and then illustrate by a drawing the method of constructing a "scale of horizontal equivalents" for 10 feet at 6 inches to a mile. A. A difference of level of 1 foot will occur in

57.3 feet on a slope of  $1^\circ$  (57.29 being the natural cotangent of  $1^\circ$ ). On a slope of  $2^\circ$  the same difference of level occurs nearly in half the horizontal distance, or  $2^\circ = \frac{57.3}{2}$ ; then  $3^\circ = \frac{57.3}{3}$ ,  $10^\circ = \frac{57.3}{10}$ , and so on.

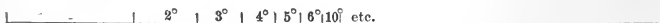
The horizontal equivalent for any given conditions can at once be found by using the above number. For instance, if the constant vertical interval be 10 feet, the horizontal equivalent for 1 foot at  $1^\circ$  being 57.3 feet = 19.1 yards, 10 feet at  $1^\circ$  will be  $57.3 \times 10 = 573$  feet = 191 yards.

$$10 \text{ feet at } 2^\circ = \frac{191}{2} = 95 \text{ yards, nearly.}$$

$$10 \text{ feet at } 3^\circ = \frac{191}{3} = 64 \text{ yards, nearly.}$$

These distances, being drawn to the scale of the plan, constitute the scale of horizontal equivalents.

At 6 inches to a mile, the distances calculated as above will produce :



Scale of H. E. at 6 inches to mile, V. I. 10 feet.

By measuring the distance between the contours on the plan by this scale, the steepness of the ground at any place may be known.

3861. Q. Two hills are 400 yards apart. The angle of elevation from one to the other is  $3^\circ$ . What is the difference in their height? A. :

$$3^\circ = \frac{57.3}{3}, \text{ or } \frac{60}{3} = \frac{1}{20}.$$

$$\frac{400}{20} = 20 \text{ yards or 60 feet.}$$

60 is generally used instead of 57.3 for slopes less than  $20^\circ$ , the ensuing error being very small.

#### SECTIONS.

3862. Q. What is a section? A. A section is a representation of the surface that would be exposed by a vertical plane cutting through a hill in any given direction.

3863. Q. Explain how to draw a section at an indicated place on a plan. A. Lay a straight-edged piece of paper along the section-line in the plan, and mark on it the exact points in which the contours cut this line. Number these points so as to identify

the contours, calling the lowest contour 0; care must be taken that each time the same contour cuts the section-line it is similarly figured.

Take a number of equidistant parallel lines, at a distance apart according to the *exaggerated* vertical scale determined on, to represent the planes of the contour; figure them 0, 1, 2, 3, etc., from the lowest upwards. Transfer the points from the edge of the piece of paper to the lowest of these lines, and raise perpendiculars to meet the corresponding contour planes. Join the heights so found by a line; this line will be the required section.

3864. Q. What is usually the object of drawing a section?  
A. To decide a question of relative height between two points on a map, or to say whether the ground between them was of such a nature that one could, or could not, be seen from the other. There are, however, quicker ways of deciding these questions than by drawing a section; so, generally, a section would only be required to test one's ability to understand a contoured plan.

#### MAKING USE OF PLANS ON THE GROUND.

3865. Q. Having a map of a piece of country, and wishing to make use of it on the site in the identification of particular points, what methods would you pursue? A. The first thing necessary is to study the scale and to impress thoroughly on the mind the space in plan which such distances as 100 yards, one half mile, and a mile will occupy. The map should, if possible, be first taken to some commanding spot which can be identified thereon. Here it will be spread out, and placed so that its position shall correspond with that of the country. This may be done in two ways. First, if any other distant conspicuous point can be identified, a straight-edge or rule is laid with its edge connecting the two points on the map (the observed place and the distant point). The map is now turned round until the edge of the ruler, so placed, is aimed at the distant point in the country. Secondly, by means of a common pocket-compass. Most maps have their side-margins practically true north and south. Knowing the magnetic variation of the needle, a magnetic meridian is drawn by means of a protractor to the right (or left) of one of the side-edges of the map, to correspond with the magnetic needle. The compass is laid immediately over this line, and the whole map turned until the needle corresponds with it (the line). Your map is now what is known as "oriented." (Care must be taken that there is no mass of iron close by.) The map being arranged by either of these methods, and weighted down, the observer may aim the ruler towards distant points, pivoting it always on the spot in the plan that represents his place.

3866. Q. Being able to recognize three distant points, explain

how to find the observer's place by what is known as the "method of adjustment" on the map. A. Lay a sheet of paper, or open note-book, level on the ground. Upon this mark a point to represent one's place. By aiming a ruler or straight-edge of any sort, draw three lines from this point towards the three distant objects. Now if this paper be placed on the map, and its position adjusted so as to bring the three lines to pass through the three corresponding places on the map, one's position may be pricked off.

#### MEASUREMENT OF DISTANCES.

3767. Q. How are distances usually measured in military sketching? A. Merely by pacing or counting the paces of a horse.

3868. Q. For a practical topographer, what is the maximum error in distance by these methods of measurements? A. Not exceeding 3 per cent.

3869. Q. How should the length of a man's pace and that of a horse, both at a walk and a trot, be tested? A. By going carefully over a measured distance beforehand. In trotting, the number of times the rider rises in the saddle should be counted.

3870. Q. What are the methods of estimating distances? A. First, by the time taken in traversing them; and secondly, and by far the most important of all, by the correct estimation of distance by the eye.

3871. Q. Is the ability to correctly estimate distance by the eye an essential requisite in the military topographer? A. Yes; without this faculty, an officer will never be an expert military topographer.

#### THE PLANE-TABLE ILLUSTRATED IN INTERSECTION AND RESECTION.

3872. Q. Explain by a drawing how the plane-table is employed in determining stations by intersections. A. The answer to this question is to be found on page 37 of the text.

3873. Q. What is meant by the term "orienting" or "setting" as applied to plane-table work? A. "Orienting" or "setting" the table means placing it in a position parallel to its original position, and therefore in a correct position with regard to surrounding objects. In other words, when a table is "set," every line on the sketch will be parallel to its corresponding line on the ground.

3874. Q. What is meant by the term "resection"? Having a compass on your plane-table, and knowing the position of two points by intersection, explain how to find one's position on the survey by "resection." A. "Resection" is the finding of the position of the surveyor on his map from the points previously determined by intersection. (For illustration of method as required



by last part of question, see page 38 of text and plates on page 39.)

#### THE PRISMATIC COMPASS AND THE PROTRACTOR.

3875. Q. What does the graduated card of a prismatic compass give? A. What is known as the "bearing" of an object; that is, the angle contained between the magnetic north line and a line from the observer to the object, or angular distance from the magnetic north.

3876. Q. How are the numbers on the card marked with reference to the direction of the needle, and why? A. They are reversed. That is to say, the north point is numbered  $180^\circ$  instead of  $360^\circ$ ; the east is marked  $270^\circ$  instead of  $90^\circ$ , and so on. This is done in order to bring the observed bearing under the eye.

3877. Q. What is the chief merit of this instrument? Is it accurate? A. Its chief merit is portability; but it cannot be relied on for great accuracy.

3878. Q. Describe the sketching protractor. A. It is a thin, rectangular slab of ivory, about  $6 \times 1\frac{1}{2}$  inches, with bevelled edges. The degrees of the semicircle from  $0^\circ$  to  $180^\circ$ —that, is from north to south, by the east—are marked on the outer edge of the protractor; the western semicircle is figured inside these, from  $180^\circ$  to  $360^\circ$ . The centre is marked by a broad arrow.

3879. Q. What is the use of the protractor? A. To "plot" the bearings found with the prismatic compass.

3880. Q. Describe the method of determining points by intersection with the prismatic compass, and plot with your protractor the following bearings, scale 6 inches to a mile:

A to B,	bearing	$215^\circ$ ,	distance	500 yards.
B to C	"	$172^\circ$	"	340 "
C to D	"	$113^\circ$	"	460 "
D to E	"	$158^\circ$	"	370 "
E to F	"	$182^\circ$	"	480 "
F to G	"	$250^\circ$	"	320 "

A. A base is first selected, carefully measured, and its bearing taken. The bearing should be taken from both ends. It is then plotted. The next step is to fix the position of important points over the ground to be sketched. This is commenced by taking bearings to them from both ends of the base. Fix one or two stations on each side of the base by observation from its ends; from them, as though from the ends of a new base, fix more distant stations. (Correctness of answer to example tested by the protractor.)

3881. Q. How would the place in the sketch corresponding with that on the ground be "resected" by means of the pris-

matic compass and protractor? A. If the bearing of any station, as A, be given, then the observer's place on the sketch is in such a position with reference to A that the bearing when protracted would pass through it. The simplest way of determining this line is to protract the bearing at A *in the reverse direction*. Then if the bearing of another station, B, be given, this would be laid off at B, but reversed. The intersection of these two lines determines the observer's place.

#### MAGNETIC VARIATION.

3882. Q. What do you understand by Magnetic Variation? A. The magnetic needle in various parts of the world deviates more or less from the meridian; this angle of deviation, or angle formed by the needle with the true meridian at any place, is called the "variation" or declination of the compass.

3883. Q. In America is the deviation to the east or west? A. To the east or west, according to locality.

3884. Q. What are the conventional signs for true north and magnetic north? A. (See frontispiece plate of text.)

3885. Q. Explain the manner of finding the true north by the sun by the method of equal altitudes. Draw a diagram. A. See page 48 of text.

3886. Q. Having found the true north, how is the variation of the compass ascertained? A. Take the bearing of true north. If the bearing is not  $360^\circ$ , then the variation is the number of degrees between  $360^\circ$  and the observed bearing; and it is east or west, according as the needle points to the east or west of true north.

3887. Q. The bearing of the sun when on the meridian is  $163^\circ$ . What is the variation of the compass? A. South end of compass is  $180^\circ - 163^\circ = 17^\circ$ ; north end to east of bearing hence  $17^\circ$  east = Ans. A diagram will show this clearly.

#### TRAVERSING WITH THE COMPASS AND FIELD-BOOK.

3888. Q. What is meant by the term "traversing"? A. Traversing is the operation of measuring the length and observing the direction of a series of straight lines along a road, or through a country; also, determining the position of adjacent objects with reference to these lines, which are termed "traverse lines."

3889. Q. Describe the Field-book. A. The field-book is a large pocket-book with a column about three quarters of an inch wide, ruled lengthwise down the centre of each page; this is called the "chain column" (whether the chain be used or not); in it (the column) are booked only the *forward* angles, or direction of the traverse-lines, and the forward distances. The side columns are used for the *offsets*, or measurements made *perpendicular to the traverse-lines*.

3890. Q. Make a rough drawing of a page of the field-book, showing the traverse of a road with four stations from which bearings were taken and with offsets right and left. A. See Plate II, page 53 of text.

#### PLOTTING.

3891. Q. Explain briefly the method of plotting, with the protractor, the notes taken from the field-book. A. See page 53 of text.

#### TRAVERSING AND PLOTTING AT SIGHT.

3892. Q. What is the difference between traversing with a field-book and traversing and plotting at sight? A. The only difference is that in the former case you record your observations in a book to be plotted afterward at your leisure; whereas, in the latter, your sketching-board and protractor are taken with you, and you plot each observation on the spot.

3893. Q. How should the sketch be held with reference to the forward angle? A. It should be held in the hand (not attached to the body), and turned so that the forward angle on paper corresponds in direction with the traverse-line on the ground; this enables the draughtsman to realize the connection between them.

3894. Q. After halting to sketch or to measure an offset, how is the counting of paces to be resumed? A. At the last number, not at zero, except on starting to measure a fresh traverse-line.

#### TRAVERSING WITH THE PLANE-TABLE.

3895. Q. In "filling in" the details of a survey, to what should the work be referred as much as possible and, therefore, where should it be commenced? A. To the stations fixed by intersection, and it should therefore be commenced at one of these stations with the intention of working up to and closing on another.

3896. Q. When the station is inconveniently situated or inaccessible, how may the starting-point for a traverse have to be found in working with a plane-table? A. By resection; or, if the plane-table can be set up within a short distance, 50 yards or so, of such a station this distance may be estimated, and the starting point taken on the paper at the corresponding distance and direction.

3897. Q. Explain by a rough drawing the method of making a traverse of a road with the plane-table. A. See page 55 of the text.

#### HILL AND MOUNTAIN SKETCHING.

3898. Q. What is the object of the present system of hill-sketching by contours? A. (1) To represent the ground with as little drawing as possible in the field, time being too valuable for the

exercise of mere draughtsmanship. (2) To give a more exact and scientific representation of the features than was formerly possible.

3899. Q. In order to sketch ground intelligently, what is it essential that the surveyor should be able to do? A. He should be able to form some conception of the shape of the features, and of the general appearance they will present in plan, before he proceeds to the application of measurements.

3900. Q. Can a "hard-and-fast" rule be laid down for hill-sketching? A. No, hill-sketching in its variety of forms can only be acquired by actual practice, and facility in the work requires special aptitude and good judgment.

3901. Q. What instrument is useful in hill-sketching? A. The clinometre, or hand-level.

3902. Q. To what particular use is the clinometer put in hill-sketching? A. The clinometer is an instrument for measuring vertical angles; therefore it is useful in determining the degree of slope of the ground.

3903. Q. Make a rough drawing, showing how the contours would run in a simple salient spur. A. See figure on page 60 of text.

3904. Q. Indicate by a line a watershed, and on each side of it a water-course, and then show how a series of contours would cross these lines. A. See figure on page 63 of text.

3905. Q. Explain what is meant by "form-lines." A. Suppose we are pacing horizontal equivalents of 76 yards down a section-line, the slope being  $5^{\circ}$ . In the middle of our pacing—that is, when we have come only 38 yards from the last contour—the slope suddenly changes to  $10^{\circ}$ . Now, the H. E. for  $10^{\circ}$  is 38 yards; but, as we have already come down half a vertical interval, we only go half this distance, 19 yards, and then put in another contour. The spot where the slope changed is marked by a dotted line called a "form-line."

3906. Q. How does mountain-sketching differ from hill-sketching? A. 1. In the employment of much greater vertical intervals in the former than in the latter; the usual vertical intervals should be at least doubled. The slopes in mountains being all precipitous ones, their horizontal equivalents on the normal system would be so small that the contours would be crowded up, and almost touching each other. 2d. As the nature of the ground in mountain-sketching precludes measurements by pacing, the judgment of the topographer comes more into play in the placing of his contours, and the determination of inaccessible points by intersection has to be resorted to more than in hill-sketching.

3907. Q. What instrument gives valuable aid in mountain-sketching? A. The aneroid barometer.

## SKETCHING WITHOUT INSTRUMENTS.

3908. Q. In an eye-sketch what implements are at the disposal of the topographer? A. A sheet of paper fastened to a board, a pencil and a flat ruler.

3909. Q. How is a scale improvised? A. By making equal divisions on the edge of a card, or on a slip of paper, and letting each of them stand for 100 yards. The representative fraction of your scale can afterwards be found at any time that a foot-rule or scale of inches is available.

3910. Q. Of what kind of work is the knowledge particularly valuable in eye-sketching? A. Any one who has worked a plane-table will make an eye-sketch without the least difficulty, and with ordinary precautions, will turn out very accurate work.

3911. Q. What is eye-sketching practically? A. It is simply plane-tableing without a compass, and without the tripod-stand for the board.

3912. Q. Explain the method of aligning your ruler on a distant object, or, in other words, how to "take a sight," in eye-sketching. A. Lay the sketch on the ground about two yards from your hand. Then lay the ruler on the sketch and stand behind the board on which it is laid, hold the pencil near the eye in the same vertical plane as the distant point, and move the ruler until it comes into this vertical plane.

3913. Q. How is the degree of slope ascertained in this method of sketching. A. It must be judged by the eye. The correctness of the contours depends on the skill of the sketcher.

## GENERAL REMARKS ON SKETCHING.

3914. Q. Give the detailed operations of making a sketch in the order they would be performed by a beginner. A. First, the measurement of base and fixing of stations by intersection; next, traversing the roads and sketching the detail; and, lastly, sketching the hill features.

3915. Q. What is specially important in selecting a traverse-line? A. That it should be as long as possible.

3916. Q. How are the contours shown on a sketch to distinguish them from other lines, say those of water-courses? A. Contours are usually drawn in a finished sketch with a red pencil, water-courses with a blue one.

3917. Q. If a sketch should get wet, what precaution is necessary? A. To be careful not to attempt any erasing on it. Wait until it gets dry, when the erasing can be done without injury to the sketch.

3918. Q. When a traverse line crosses a stream, deep railway cutting, etc., how is it best to obtain the distance to the farther

side? A. It is better to *estimate* the distance to the farther side, and then resume the pacing than attempt to pace the distance.

#### REACHING CONTOURED PLANS.

3919. Q. When a contoured plan is about to be examined, what preliminary points are to be attended to before commencing to answer questions in connection with it? A. 1. What is the scale of the map? 2. Is it contoured on the normal system, or not? 3. Where is the north point?

3920. Q. What common and practical questions suggest themselves to you as likely to be asked in regard to a contoured map? A. 1. Questions regarding slopes, and their practicability for the manœuvres or movements of troops. 2. Questions regarding the gradients of roads. 3. Questions regarding the relative height of points, and the view obtainable from any given spot.

3921. Q. In examining a contoured plan, what is the first thing that should be recognized? A. The lowest part of the country represented, which is usually occupied by the largest body of running water.

3922. Q. What is the next thing to be recognized? A. The watersheds occupying the ground between the water-courses.

3923. Q. How are the relative heights of hills compared, and how is the difference of level found? A. The relative heights are compared by counting the contours from the *col* which connects them, or, if more convenient, count the numbers from the intervening water-course. The difference of level is found by multiplying the vertical interval between the contours by their number.

(NOTE.—With the assistance of a good contoured map, a number of practical questions and answers can be used by the examiners.)

#### RECONNAISSANCE OF A DEFENSIVE POSITION.—SKETCH AND REPORT.

3924. Q. How is the reconnaissance of a position made available to a commanding general? A. By, in the first place, an as accurate a sketch as the limited time at the disposal of the officer will allow, and by a report, supplemental to the sketch, including in it all the information desired, and supplying the points in which the sketch is deficient.

3925. Q. How does the scale of a sketch of a position compare with that for a sketch of a road? A. It should be much larger. For instance, the usual scale for a road-sketch is 3 inches to a mile, or even smaller, while that of a position should be at least 6 inches to a mile.

3926. Q. In sketching a position before an engagement, would there ordinarily be time to use the prismatic compass or plane-table? If not, how should the sketch be made? A. No; the sketch

would have to be made generally with the eye, or by the aid of what is known as the "Cavalry Sketching-case."

3927. Q. Is it necessary to include in the sketch any details of the surrounding country? A. Yes; the general lay of the ground in front, rear, and on the flanks should be shown, and prominent details put in.

3928. Q. Give under the following heads of a report on a position, the information that a reconnoitring officer should furnish: 1. The Position. 2. Advantages. 3. Disadvantages. 4. The Country in the Vicinity. 5. Communications. 6. Bridges. 7. Rivers. 8. Woods. 9. Fences. 10. Obstructions and Demolitions, Trenches, and other Works. A. See page 97 of text.

#### SKETCHING ON HORSEBACK.

3929. Q. What implement is generally used in sketching on horseback? A. What is known as the "Cavalry Sketching-case," or "Field Sketching-board."

3930. Q. What is the object of the Cavalry Sketching-case? A. To simplify the performance of rapid sketches on active service, a high degree of accuracy not being necessary.

3931. Q. Explain how to draw the direction of a road, or of any object, with the cavalry sketching-case. A. 1. Turn the horse exactly in the direction of the object. 2d. Revolve the board on the wrist until the meridian-line corresponds with the needle. 3d. By moving the arm to the right or left, bring the point from which the line is to be drawn on the sketch, opposite the centre of the body. Now, turn the ruler in the required direction, its edge corresponding with this point, and draw the line; but just before doing this, glance again at the meridian-line, to see that it coincides with the needle, and that the latter does not touch the box.

3932. Q. How are contours determined in a sketch on horseback? A. They are determined in the usual manner, either by the eye, or by the aid of a clinometer, independent of the sketching-case, or sometimes by the aid of a clinometer on the back of a special pattern of case and a part of it.

3933. Q. What scales are used in a sketch on horseback, and where are they generally put for convenience? A. A scale of horse-paces and a scale of hundreds of yards, both to be constructed on the edge of the ruler. The scale of paces should not be numbered, so that it may not be necessary to adjust its zero to a point on paper.

#### LAYING OUT AND CONSTRUCTING ROADS.

3934. Q. What are the conditions desirable in a road connecting two places? A. That it should be straight and level.

3935. Q. Can both these conditions be fulfilled by a road in an ordinary country? If not, which condition should be sacrificed to the other? A. No. If level, it must follow a winding-course, avoiding the eminences; if straight, it must ascend and descend them. As a rule, straightness should be sacrificed to levelness.

3936. Q. For military roads, what should be the maximum gradient? A. It should rarely exceed 1 in 20.

3937. Q. What is a sufficient width for military roads? A. Sixteen feet, or wide enough to permit wagons to pass each other.

3938. Q. How is the centre of roads made with reference to the sides, and why? A. The centre is made somewhat higher than the sides, so that rain-water may at once run off into the ditches on either side. A slope of 1 in 24 is usually given from the centre.

3939. Q. Give in detail, briefly, the operations in laying out a road on the ground and the details of construction of a "metalled" road. A. See pages 167 to 171 of text.



## PART XII.

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### *ARMY REGULATIONS.*

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FOR CAPTAINS OF THE Q. M. DEPT.—Nos. 3940–4161.

FOR CAPTAINS OF THE SUB. DEPT.—Nos. 3940–4073 and 4162–4230.



## PART XII.

### *ARMY REGULATIONS.*

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#### ARTICLE LVI.

##### PUBLIC MONEY, PROPERTY AND ACCOUNTS.

3940. Q. What is required by the Revised Statutes and act of Congress regarding the purchase of supplies for the army? A. They require advertising a sufficient time for proposals for all purchases and contracts for supplies, except personal services, unless public exigency requires immediate delivery or performance; and that purchases for the Quartermaster's and Subsistence Departments shall, except in case of emergency, be made only after public notice of not less than ten days for small amounts for immediate use, and of not less than from 30 to 60 days.

3941. Q. Is advertising restricted solely to newspapers? A. No; proposals may be invited through hand-bills, posted in public places, or circular-letters; but advertising in newspapers will be resorted to when time permits, and when, in the judgment of the disbursing officer, the proposed expenditure is sufficiently large to justify it.

3942. Q. By whom will notices inviting proposals be issued, and what will be done with such notices? A. Notices will be issued by the officer who is to make the contract or purchase; in special cases, however, if competent authority direct it, by any other officer. All such notices will be promptly forwarded direct to the proper bureaus, of the War Department, together with all information required for a complete understanding of the necessity for the proposed contract or purchase.

3943. Q. When any notice or proposal for the War Department or any of its bureaus is published in a newspaper, what authority therefor must be obtained, and how will such authority be designated? A. The written authority of the Secretary of War must be obtained, and it will be either "special" or "general."

3944. Q. When the authority for advertising is "special," or "general," what will it authorize? A. The publication of the particular advertisement therein when special; when general, it

will authorize the officer to whom it is granted to publish from time to time, in the newspapers designated in the letter of authority, such advertisements for proposals, for labor or supplies, as as he may find necessary during a specified period.

3945. Q. To whom will "general" authority for advertising be granted? A. Only to disbursing officers who are required to purchase or contract for supplies or services.

3946. Q. What must a request for authority from the Secretary of War to advertise state? A. It must name the paper or papers on the official list of the department, in which it is deemed proper to make publication, and will set forth the schedule of advertising rates of such papers. If it be considered desirable to advertise in a locality where there is no official newspaper, or in a paper not on the list, the request will so state, and with this request a sworn schedule of the advertising rates of such papers will be submitted.

3947. Q. When advertising sales of property, or for proposals for labor or supplies, how much time should be allowed to intervene between the date of the first publication of the advertisement and the day of sale or date designated for the opening of proposals? A. Thirty days. A shorter period may be named if the necessities of the service render it advisable; but no period less than ten days shall be designated except in case of emergency.

3948. Q. How many insertions of advertisements will ordinarily be permitted? A. Six insertions in daily or four in weekly papers; four consecutive at the beginning and two just before date of opening bids, when more than two days are to intervene.

3949. Q. In cases of great emergency, how may authority be obtained for advertising? A. Requests may be made by telegraph, the date and nature only of the advertisement to be stated.

3950. Q. What is required in order to settle bills for advertising in newspapers? A. Prior to payment they must be submitted to the Secretary of War for approval. The officer who issues the advertisement will cause the publishers to furnish him with their bills in duplicate and copies of the paper containing the advertisement, and he will cause the vouchers to be prepared and certified on the official forms, with the nature of the advertisement clearly described. A copy of the advertisement, cut from the newspaper will be attached to each voucher, and indorsed thereon will appear a copy of the letter of authority. The accounts, thus prepared, together with the original bills will be forwarded direct to the chief clerk of the War Department.

3951. Q. In the event of accounts being presented to officers for advertising which they have not ordered, but which may have been ordered by the Secretary of War, what certificate is attached to the account before sending it to the War Department? A. "I certify that the annexed advertisement was cut from the news-

paper named in the above account, and that it was inserted in that newspaper for the period stated."

3952. Q. What will be done with the outstanding bills for advertisements pertaining to his office in the event of the death, removal, resignation, or transfer to another station of an officer? A. They will be prepared, certified, and forwarded by his successor, who is authorized to vary the form according to the facts.

3953. Q. What are officers changing station required to leave with their successors concerning advertisements? A. Complete records relative to unsettled accounts for the same.

3954. Q. What will the heads of the several bureaus of the War Department furnish to officers charged with the publication of advertisements? A. Complete lists of newspapers designated by the Secretary of War, and all necessary blanks for compliance with the regulations.

3955. Q. Where are all blank forms, blank books, etc., as a rule prepared, and what publication in newspapers is forbidden? A. Blank forms and blank-books are prepared at the Government Printing-office and can be obtained by requisition upon the heads of the proper staff departments. The publication of military orders and circulars in newspapers is forbidden.

3956. Q. How is the printing for division and department headquarters done? A. It will be advertised for under the law giving 30 days' notice. Bids for printing will be invited and contracts made for so much per 1000 "ems," the agreement to provide for as speedy prosecution of the work as may be required. The contract should run through the fiscal year.

3957. Q. How are the bills paid for contract printing? A. They will be submitted for approval of the Secretary of War, in the same manner as accounts for advertising.

#### CONTRACTS AND PURCHASES.

3958. Q. What restrictions are placed upon officers regarding the making of contracts or purchases on behalf of the United States? A. No contract or purchase shall be made unless the same is authorized by law, or is under an appropriation adequate to its fulfilment, except in the War and Navy Departments, for clothing, subsistence, forage, fuel, quarters, or transportation—which, however, shall not exceed the necessities of the current year.

3959. Q. When may purchases be made or services engaged in open market? A. When the emergency is such that there is not time to invite sealed proposals by advertising, or by posters and circular-letters, or when such proposals have been invited and no bids have been received.

3960. Q. What are bidders for supplies to be informed of? A. The kind, quantity, and quality of articles required; place, time,

and rate of delivery, and conditions of payment. They will be furnished with such specifications as have been adopted, and will be permitted to examine the standard samples at the place where they are deposited.

3961. Q. What are bidders for labor to be informed of? A. The nature and extent of the services required, where they are to be performed, and the time allowed for performance. They will be furnished with, or allowed to examine, plans and specifications of all works upon which they desire to bid, and will be furnished with any necessary information needed to enable them to act understandingly.

3962. Q. What information is to be conveyed to a bidder relative to other bidders? A. No bidder will be informed, directly or indirectly, of the name of any person intending to bid or not to bid, or to whom information in respect to proposals has been given.

3963. Q. How should proposals be prepared? A. In strict accordance with the requirements of the advertisement or circular of instructions. A copy of such advertisement or circular will be attached to the proposal, and form a part of it. Plans or specifications which have been furnished to a bidder will be referred to by him in his proposal. Numbers and prices will be written in words as well as expressed in figures; but when a great variety of articles are required, such as stationery, hardware, etc., quantities and prices may, if the amounts involved are inconsiderable, and the forms of proposals so indicate be expressed only in figures. Erasures or interlineations should be explained by the bidder, in the proposal, over his signature.

3964. Q. What assistance by the military authorities may be given to a bidder in the preparation of proposals? A. None whatever by any person in the military service.

3965. Q. How many copies of a proposal should be made, and how signed? A. As many as may be required by the officer making the contract; they will be signed by the bidder submitting them, with his usual signature in full.

3966. Q. What is done when a firm is the bidder, and an agent signs for the firm? A. The member or agent who signs the firm-name to the proposal will state the names of all the individuals composing the firm. If an agent signs, he must file legal evidence of his authority to do so.

3967. Q. When no guarantee is required, what must bidders do if called for by the awarding officer? A. Furnish satisfactory evidence before the award is made of their ability to carry the proposals into effect.

3968. Q. In what manner must proposals be inclosed? A. They will be securely sealed in suitable envelopes, indorsed and addressed as required by the advertisement, and must be in the

possession of the officer addressed before the hour appointed for the opening.

3969. Q. When an advertisement calls for proposals to furnish labor or supplies at more than one place, what will be done? A. A separate proposal will be made for performance at each place, but all may be submitted in one envelope.

3970. Q. What is done with proposals received prior to the time of opening the same? A. They will be securely kept, so that they cannot be tampered with. The officer whose duty it is to open them will decide when that time has arrived, and no proposal for that opening will thereafter be received.

3971. Q. When may a bidder withdraw his proposal, and how should it be accomplished? A. If a bidder wishes to withdraw his proposal, he may do so before the time fixed for the opening, without prejudice to himself, by communicating his purpose in writing to the officer who holds it; and when reached, it shall be handed to him or his authorized agent, unread.

3972. In what manner will proposals be opened? A. They will be opened and read aloud at the time and place appointed for the opening. All the bidders have the right to be present, and a record of each proposal shall then and there be made upon an abstract prepared.

3973. Q. To what bidder, as a rule, will contracts be awarded? A. To the lowest responsible *bona fide* bidder, who, when required, produces a proper article, and whose proposal therefor is not unreasonable. In rare cases, the United States may elect to exercise the right to reject proposals.

3974. Q. What guarantees will be required to accompany proposals? A. Written guarantees, signed by two responsible parties, whenever in the opinion of the officer authorized to make the contract such guarantees are necessary to protect the interests of the Government.

3975. Q. When guarantee is required, how will bidders be informed of the fact? A. The fact will be stated either in the advertisement or in the printed circular of instructions. The sum of the guarantee and the period that will be allowed after the date of award, for execution of the contract and bond will also be stated therein.

3976. Q. When proposals for supplies for the general service of a department are received at its headquarters, what will the chief officer of that branch to which they pertain do? A. He will submit them to the department commander, and under his supervision shall make the award and contract, unless higher authority be necessary.

3977. Q. What will be done with proposals for supplies received at a post? A. After having been carefully examined, indorsed, and abstracted, they will be submitted by the officer receiving them, with his recommendation as to the proper person

to whom the contract should be awarded, to the post commander, who will forward them with his recommendation to the department headquarters, where necessary action is taken.

#### ARTICLE LVII.

3978. Q. How many copies of contracts will be executed, and for whom are they intended? A. They will be executed in quintuplicate: one is for the contractor; one for the contracting officer or inspector who receives the supplies; one for the proper Comptroller of the Treasury; one for the head of the bureau of the War Department to which the contract pertains, and one for the Returns officer of the Interior Department. The latter will be accompanied by copies of the advertisement in writing proposals, and of all bids, offers, and proposals received under it and by the affidavit prescribed.

3979. Q. What will be done with all papers relating to any contract? A. They will finally be transmitted to the bureau of the War Department to which they pertain.

3980. Q. What assistance is forbidden contractors? A. The labor of troops or Government employes, or means of transportation shall not be used to enable contractors to fulfil contracts, except in cases of manifest necessity, and then only on the written authority of the proper commander, and full deduction shall be made for the services rendered,

3981. Q. When may contracts be made at posts? A. Only when specially ordered by superior authority, and they will not be ordered unless the stores or services required, of proper quality, can be procured as cheaply there as elsewhere.

3982. Q. What amount of penalty is to be entered in the contractor's bond? A. Not less than one tenth, nor more than the full amount of the total consideration of the contract.

3983. Q. In what amount will the sureties jointly justify, and before whom will the affidavit be taken? A. They will justify in double the amount of the penalty. The affidavit will be taken before any official, or person, authorized by the laws of the United States, State, Territory or district to administer oaths.

3984. Q. What shall the justification of guarantors and sureties be followed by? A. The certificates of the judge of a United States court, or United States district attorney, or, in their absence, by some other civil official of the United States, who shall certify that the guarantors or sureties are known to him, and that to the best of his knowledge and belief each is pecuniarily worth over and above all his debts and liabilities, the sum stated in his affidavit of justification. If necessary, or more convenient, separate certificates may be furnished as to each guarantor or surety.

3985. Q. How are bonds to be executed? A. By the con-



tractor as principal, and two sufficient and responsible persons as sureties. Each must affix to his signature a formal seal of wax, or other adhesive substance, and each signature must be attested by at least one witness. When practicable there will be a separate witness to each signature. Sureties must be citizens of the United States.

3986. Q. What parties will not be accepted as sureties? A. A firm will not be accepted, nor will a partner be accepted as a surety for a co-partner, or for a firm of which he is a member; nor will an officer of a corporation be accepted as surety for such corporation.

3987. Q. Under what conditions may the surety of a guarantor or the guarantors to a bidder's guarantee be accepted? A. When they are able to justify, as required for the bond.

3988. Q. How many copies of a bidder's guarantees and contractor's bonds will be executed, and what is done with them? A. In duplicate: one copy of the bond accompanies the contract sent to the Treasury, and the other is retained by the officer who makes the contract.

3989. Q. What will be attached to the quintuplicate copy of the contract prepared for the Returns Office? A. The certificate of the officer making the contract in the language prescribed in the regulations.

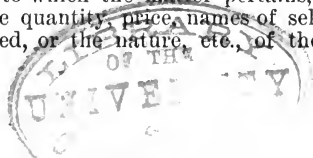
3990. Q. When may a simple contract, properly prepared, be substituted for a formal contract under seal? A. When its stipulations are to be fully performed within 30 days from its date, and when it involves a sum not greater than \$3000.

3991. Q. When purchases are made under sealed proposals without executing formal written contracts, what must the successful bidders be furnished with? A. A written notification of the acceptance of their proposals, which will expressly state the name of the article, quantity, quality, price, kind of package, and time and place of delivery.

3992. Q. When services other than personal, are engaged under sealed proposals without executing formal written contracts, what must the successful bidders be furnished with? A. Written notifications of the acceptance of their proposals, which will show clearly the nature and extent of the services, the dates when they begin and end, and the price agreed upon.

3993. Q. How are emergency purchases made? A. When the emergency is such that there is not time for inviting sealed proposals by advertising purchases may be made, or services engaged in open market, in the manner usual among business men.

3994. Q. What is required of the officer making emergency purchases with regard to them? A. He will at once transmit, to the head of the bureau to which the matter pertains, a report, setting forth in detail the quantity, price, names of sellers, etc., of the supplies purchased, or the nature, etc., of the services



employed, together with a statement of the circumstances of the case, and his reasons for not inviting proposals.

#### ARTICLE LVIII.

3995. Q. In what manner and to whom may advances of public money be made? A. To no one, except disbursing officers of the Government as may be necessary to the fulfilment of the public engagements. The President may, however, direct such advances as he may deem necessary and proper to be made to persons in the military service, employed on distant stations, when they cannot regularly receive the pay to which they may be entitled.

3996. Q. What are disbursing officers forbidden to do regarding indebtedness on account of the Government? A. They are forbidden to pay any account or indebtedness until it is fully due, except as provided for.

3997. Q. What is required of the officers of the Quartermaster's and Subsistence Departments before entering upon the duties of their respective offices? A. They will give good and sufficient bonds to the United States, in such sums as the secretary may direct, faithfully to account for all public moneys and property which they may receive.

3998. Q. Can the amount of bonds given by officers upon entering on their duties be increased? A. Yes; the President may, at any time, increase the sums so prescribed.

3999. Q. What will occasion a disbursing officer being deemed guilty of embezzlement? A. One failing to deposit promptly with the treasurer, assistant treasurer, or designated depository of the United States the public money intrusted to his charge, or who fails to keep safely, without loaning, using, or converting in any way, or exchanging for other funds, or depositing in other than a designated depository the public money or any portions thereof collected or received by him until he is duly authorized to transfer or disburse the same.

4000. Q. What must be done with public money transferred to a disbursing officer? A. It must be immediately deposited to his official credit, either with the U. S. Treasurer, Assistant Treasurer, or designated depository.

4001. Q. In what case may a disbursing officer keep Government funds in his own possession? A. If specially authorized by the Secretary of War, when stationed on the extreme frontier, or at places far remote from depositories, he may keep at his own risk such public funds as may be intrusted to him for disbursement. An officer receiving money remitted to him upon specific estimates may disburse it without waiting to place it in a depository, provided the payments are due.

4002. Q. In what cases may a disbursing officer draw his check

in favor of himself or bearer? A. To make payments of amounts not exceeding twenty dollars; to make payments at a distance from a depositary; and to make payments of fixed salaries due at a certain period.

4003. Q. If there be two or more designated depositaries in the same place, how must a disbursing officer regulate his deposits, disbursements, and transfers? A. So as to maintain as far as possible a proportion between his deposits with the said depositaries and the amount of securities filed by the latter with the U. S. Treasurer. This will not authorize the transfer from one depositary to another of funds placed by the Treasury Department to the credit of disbursing officers.

4004. Q. When a disbursing officer serves in two distinct capacities, how must he deposit the funds advanced to him? A. Separately and according to the bureau to which they belong, and the balance to the credit of each bureau will be reported on separate weekly statements of funds.

4005. Q. Who designates the depositaries for the use of disbursing officers? A. The names of the depositaries are published from time to time in orders from the Adjutant-General's office.

4006. Q. In making payments by check, what checks will be used? A. Only those authorized and supplied in blank check-books by the heads of the departments to which the disbursements pertain.

4007. Q. What will be entered in the check-books at the close of business on the last day of each calendar month? A. The accounts carried on both sides of the stub pages will be balanced to include the last deposit made and check issued within the month. The balance, which will show the amount on deposit subject to check, will be carried to the head of the deposit account for the next month. The monthly list of outstanding checks will be filed with the check-book.

4008. Q. What will be entered upon the deposit page of a check-book opposite the last check drawn on Saturday of each week? A. A memorandum (in red ink) showing the balance with the depositary at the close of business on that day, and the data upon which it is based.

4009. Q. When an officer is relieved from disbursing duty, what will he do with regard to unused checks? A. He will turn all of them over to his successor, taking duplicate receipts therefor. He will also notify the depositary and the chief of the bureau to which the disbursements pertain of the serial numbers of the checks so transferred. Checks will be transferred from one officer to another in a similar manner. Should the accounts of the officer be closed, all unused checks and blank check-books will be transmitted to the chief of the bureau from whom they were received.

4010. Q. What must a disbursing officer state upon the face of

each check? A. A disbursing officer drawing checks on moneys deposited to his official credit will state on the face of each check the object or purpose to which the avails are to be applied; and, in case of payment to officers or enlisted men, the period covered by the payment.

4011. Q. In what manner will the proceeds of sales of old materials, condemned stores, or other public property be disposed of? A. They will be deposited and covered into the treasury as miscellaneous receipts on account of "Proceeds of Government Property," and shall not be withdrawn or applied without a subsequent appropriation by law; except that moneys received from the sale of stores, materials, or supplies to officers and enlisted men, or to any exploring or surveying expedition authorized by law, and all sales of subsistence supplies, shall respectively revert to the appropriation out of which they were originally expended, and shall be applied to the purposes for which they were appropriated by law.

4012. Q. What will be done with the proceeds of sales of all public property not specially excepted? A. They will be deposited as miscellaneous receipts, without abatement or reduction, to the credit of the Treasurer of the United States, either at the Treasurer's office or at the office of one of the assistant treasurers, or with some designated depository of the United States.

4013. Q. How will military stores and property condemned and ordered sold be disposed of? A. At auction, for cash, on due public notice, and in such market as the public interests may require. The officer making the sale will suspend it when, in his opinion, better prices can be obtained, except in the case of condemned animals. The auctioneer's certified detailed account of the sale, and the vouchers for the expenses attending it, will be reported on the proper forms to the chief of the department to which the property belonged.

4014. Q. What restrictions are placed upon the expenditures of public moneys appropriated for fiscal years? A. Funds appropriated for one fiscal year cannot be used to liquidate liabilities incurred in another, nor can funds be used for any other purpose than that for which they were appropriated. No department of the Government shall expend in any one fiscal year any sum in excess of appropriations made by Congress for that fiscal year, or involve the Government in any contract for the future payment of money in excess of such appropriations.

4015. Q. What is the length of time allowed for outstanding checks, and what should be done at the end of that period? A. At the end of each fiscal year all amounts of money represented by checks or drafts, drawn three or more years prior thereto, by any disbursing officer, upon the treasurer, an assistant treasurer, or any designated depository, and which remain credited to such officer, shall be covered into the treasury, and

there stand to the credit of the payees or *bona fide* holders of such checks or drafts.

4016. Q. How long may a disbursing officer be credited with an unchanged account in a depositary, and what will be done with the same? A. All amounts of money held by the treasurer, and assistant treasurer, or a designated depositary, credited to a disbursing officer whose account has remained unchanged, either by deposit or payment, for the space of three years, shall likewise be covered into the treasury, to be placed to the credit of such officer, if it be found that he is entitled to the credit.

4017. Q. When money is deposited, what is to be noted on the account current of an officer? A. The date and the amount of the deposit, and the number of the certificate, together with the appropriation, if specified, will be noted on the account current upon which the depositor desires to be credited with the money so deposited.

4018. Q. What are the regulations concerning certificates of deposits? A. The originals of all certificates of deposit for the deposit of public moneys of every character, except as stated, will be forwarded to the Secretary of the Treasury immediately upon their issue by the depositors (not the depositaries), who, before transmitting them, will see that their amounts correspond with the sums actually deposited. Those issued to disbursing officers, for funds deposited to their official credit, subject to the payment of their checks, and more properly called disbursing officers' receipts, will be retained in their own possession. Those issued for the transfer of funds from one depositary to another, will be forwarded to the Treasurer of the United States. In no case will certificates of deposit be filed with accounts-current, rendered by officers to the accounting officer of the treasury. In taking credit thereon for deposits, officers will state specifically the date of the deposit and the designation and location of the depositary.

4019. Q. What will officers who make deposits of public funds to the credit of the Treasurer of the United States forward with the original certificates? A. A statement showing distinctly the source from which the money was derived, i.e.: If a balance of funds for disbursement, the appropriation and fiscal year will be correctly named; if in refundment of an overpayment, when, by whom, and upon what voucher the overpayment was made; if from stoppages on pay-rolls, on account of loss of, or damage to, property by employés, or on account of sales to them, for which property the depositing officer is himself responsible, the character of the property and the date of loss or sale will be given, and a reference made to the officer's property voucher accounting for the stores; if from stoppage on account of loss, damage, or sale of property for which an officer, other than the depositing officer, is responsible, the name of the responsible officer will be given, together with a list of the persons from whom deductions

were made, stating the character of the property and the amount deducted in each individual case; in like manner, deposits of funds received from collections, from sales to officers and enlisted men, or on account of losses or forfeitures, will be fully explained.

4020. Q. Under what circumstances may duplicate checks be issued by disbursing officers? A. When an original check not exceeding in amount \$2500 is lost or destroyed, the disbursing officer may, after six months and within three years of its date, issue a duplicate of the same, which the treasury or designated depositary may pay, upon the fulfilment of certain conditions, which the Secretary of the Treasury is authorized to prescribe.

4021. Q. What is required of a party in order to obtain a duplicate check? A. The party in interest must furnish the officer or agent who issued the original with an affidavit giving the name and residence of the applicant in full, describing the check and its indorsements, showing his interest therein, detailing the circumstances attending its loss, and what action, if any, he has taken to stop payment thereon. The affidavit must be made and signed, before an officer authorized to administer oaths generally, and he must certify that he administered the oath. The claimant must also furnish to the same officer or agent a bond, prepared and executed on the blank form which will be furnished to any officer or agent applying therefor. The affidavit, and the bond, when executed, are to be indorsed by the officer or agent as having been submitted to him, and as being the proof and security upon which he has acted. After the expiration of six months from the time the original check was issued, the officer or agent will issue a duplicate, which must be an exact transcript of the original, especially as to number and date.

4022. Q. How many copies of an account-current will be made, and what will be done with them? A. Accounts-current will be made in duplicate. One copy, accompanied by abstract and vouchers complete, will be forwarded to the chief of the bureau within ten days after the end of every calendar month; the other, with the duplicate, abstracts, and vouchers, will be retained by the officer.

4023. Q. How will money received and disbursed under the appropriation for "Contingencies of the Army" be accounted for? A. In a separate account current.

4024. Q. What will officers in rendering accounts which eventually pass to the Treasury Department for settlement do? A. Send them, with the necessary vouchers, direct to the bureau of the War Department to which they pertain.

4025. Q. What is required of disbursing officers regarding a rendition of their accounts? A. Disbursing officers are required to prepare their accounts and deposit them in the post-office on or before the tenth day of each month. Irregularities in the mail-

service or want of blank forms will not excuse non-compliance with this paragraph. If printed blanks are not furnished, the forms will be prepared.

4026. Q. How will accounts-current be kept as regards fiscal years, and what must be noted in red ink? A. No account current will contain accounts of different years; and no item will be entered thereon, unless it pertains to the fiscal year to which the account pertains. Accounts-current, abstracts and vouchers, including transfers and refundments, will have noted in red ink on the face, and indorsed in the brief on the back, the fiscal year to which the funds pertain.

4027. Q. What will be done with public funds on hand at the close of the fiscal year? A. Except those required to pay outstanding liabilities incurred during such year (a schedule of which will accompany the last account-current rendered for the year) all funds will be deposited, and the disbursing officers' account closed by a credit for such deposit.

4028. Q. For what purposes may balances be retained, and how will they be accounted for? A. Balances may be retained after the close of the fiscal year for the purpose of paying outstanding liabilities; they will be carried to a "supplemental account-current" for the fiscal year to which the funds pertain. When disbursements are made from such balances, accounts will be rendered as "supplemental accounts" for the fiscal year to which the funds pertain.

4029. Q. How many copies of money-vouchers must be made, what will they specify, and what must be expressed on their face? A. Vouchers will ordinarily be made out in duplicate; occasionally, in special cases, in triplicate. The number executed will be distinctly stated on each copy. Vouchers for the disbursement of money will specify the quantity and price of each article bought, the name and place of business of the person from whom it is procured, and the date and manner of purchase. When the vouchers are for services rendered, they will state the nature and period of service, with rate of pay per day or month. The facts on which an account depends must be stated and vouched by the certificate of an officer. All vouchers for purchases or service, except personal, must have expressed on their face, immediately below the statement of the account, the mode of purchase or engagement.

4030. Q. In what terms will accounts be expressed? A. Accounts will be expressed in terms of dollars and cents. When fractions of less than one half cent occur in the footing of a voucher, they will be disregarded; if the fraction be one half or greater, it will be reckoned as a cent.

4031. Q. What will be forwarded with the accounts and returns of a disbursing officer regarding money-vouchers? A. All orders of commanding officers, and other papers, upon which the officer accountable relies to relieve himself from responsibility.

4032. Q. Under what conditions may money be paid to an authorized agent or attorney? A. Upon his producing and filing with the disbursing officer or the accounting officers a power of attorney, or other written authority properly executed, authorizing him to receive such money and to give a receipt or acquittance therefor, and a voucher, signed with the name of such person, firm, or corporation, by the agent or attorney, will be deemed sufficient. If the authority of the agent or attorney is produced to the disbursing officer and filed with his account, it must be returned by him to the accounting officers, with the vouchers and other papers relating to the payments.

4033. Q. Under what conditions may small sums for local service be paid by disbursing officers? A. Receipts for small sums for occasional service paid to corporations, such as railroads, telegraph, turnpike, transfer, express, steamboat, hotel, newspaper, and ice-companies, may be signed by the local agent in charge of the business of the company at the place where the service is rendered, or where it begins or terminates, and the certificate of the officer making payment that the person to whom payment was thus made was then the local agent of the company, in charge of its business at the place designated, will be sufficient evidence of the agent's authority to receive and receipt for the money paid.

4034. Q. What is done with original money-vouchers, and under what circumstances may copies be furnished? A. Original vouchers will accompany the accounts; copies will not be admitted, unless accompanied by satisfactory evidence of the loss or destruction of the originals; or that their retention is indispensable to the performance of duty by an officer acting under orders. When originals cannot be furnished, copies duly certified as true, by a disinterested officer, will be accepted. If no other officer than the payor or payee is at the post when payment is made, both will certify to that fact, and also to the correctness of the copy. When vouchers are not sent with the account to which they belong, but are subsequently rendered, suitable explanation will be made.

4035. Q. How must money-vouchers be made out before receipts are given or taken by officers? A. All officers are forbidden to give or take receipts in blank for public money or property; in all cases the voucher will be made out in full, and the date place, and exact amount of money, in words, will be written out in the receipt before it is signed.

4036. Q. What must be done with mutilated checks? A. Mutilated checks will be forwarded to the depositary to which they pertain, and a record made, on the stub of the check-book, of the date of transmission.

4037. Q. To whom will disallowed accounts be charged? A. An officer shall have credit for an expenditure of money or



property made in obedience to the order of his commanding officer. If the expenditure is disallowed, it shall be charged to the officer who ordered it.

4038. Q. When will disbursing officers make statements of funds on hand? A. Disbursing officers will, at the close of business on Saturday of each week, make and forward to their respective chiefs of bureaus weekly statements of funds, showing exactly where their funds are deposited. A monthly statement of funds will be rendered when the last day of the month does not fall on Saturday.

4039. Q. What will be done when an officer is relieved from duty in a staff department at any station, relative to Government indebtedness? A. He will certify the outstanding debts, if any, to his successor, and transmit an account of the same to the head of the proper bureau. Unless otherwise ordered, he will turn over to his successor the public money, property, books, and papers pertaining to the service from which he is relieved.

4040. Q. What number of days per month is used for the computation of time in the payment for services rendered? A. Thirty days will be assumed as the length of the month whatever be the number of days therein.

4041. Q. What are the regulations concerning disbursing officers betting at cards or games of hazard? A. If any disbursing officer shall bet at cards or any game of hazard, his commanding officer shall suspend his functions, require him to turn over all public funds in his keeping, and shall immediately report the case to the proper bureau of the War Department. In every instance where an officer intrusted with the care or disbursement of public funds shall violate this regulation, he will be brought to trial before a general court-martial by the department commander.

4042. Q. What are the regulations concerning the interest of officers or others in the purchase of supplies? A. No officer disbursing money for the military service, or directing the disbursement thereof, shall be concerned, individually, directly or indirectly in the purchase or sale of any article intended for, making a part of, or pertaining to, the department of the public service in which he is engaged. No officer, or clerk of a disbursing officer, shall be interested in the purchase of any soldier's certificate of pay due, or any other claim against the United States. Officers or agents in the military service shall not purchase supplies for the Government from any other person in the military service; nor shall they contract with any such person to furnish supplies or service to the Government, nor make any Government purchase or contract in which such person shall be admitted to share or receive benefit.

## ARTICLE LIX:

4043. Q. What must be done with property coming into an officer's possession, and what will be done when transferring the same? A. All property, whether paid for or not, which comes into the possession of an officer, must be properly accounted for on his returns. An officer transferring stores will furnish the receiving officer with invoices, in duplicate, in which such stores shall be accurately enumerated, and the latter will return his duplicate receipts. The transaction will appear on the property returns rendered by each.

4044. Q. What will be done when an officer to whom public property has been transferred refuses to receipt for it? A. The officer who invoiced it will report the facts to the proper commanding officer of the former, and ask redress. Copies of all papers relating to the transaction will be filed with his returns.

4045. Q. What will be done upon the receipt of public property by an officer? A. He will make a careful examination of the same to ascertain its quality and condition, but will not break original packages until issues are to be made, unless he has reason to believe that the contents are defective. Should he discover defect or shortage, he will apply for a board of survey to determine it and to fix the responsibility therefor. Should he consider the property unfit for use, he will also submit inventories, in triplicate, and request the action of an inspector. The same rule will be observed in regard to packages when first opened for issue, and for property damaged or missing while in store.

4046. Q. What must be done to be relieved of responsibility for property worn out in the public service? A. The preliminary action of a board of survey is not necessary, and the officer responsible will submit inventories thereof and ask for an inspector's action. When the action of a board of survey and an inspector are necessary, the inventory will be accompanied by a copy of the proceedings of the board.

4047. Q. What must be done when packages of military supplies are opened for the first time after coming into possession of an officer, whether because of apparent affect, or for issue? A. He or some other commissioned officer will be present and verify the contents by actual weight, count, or measurement, as circumstances may require; and, in case of deficiency or damage, he will make written report of the facts to the post commander. If the responsible officer be present and make the report, he will secure the attendance of one or more civilians or enlisted men, to make sworn statements in writing regarding the condition of the property when examined.

4048. Q. What action must be taken whenever information is received that animals, or other property belonging to the United

States, are unlawfully in the possession of any person not in the military service? A. The quartermaster, or other responsible officer, will cause proper proceedings to be promptly instituted and diligently prosecuted, before the civil authorities, for the recovery of the property; and, if the same has been stolen, for the arrest, trial and conviction, and due punishment of the offenders and their accomplices.

4049. Q. Under what circumstances might property of the U. S. be seized? A. Upon satisfactory information that United States property, unlawfully in the possession of any parties, is likely to be taken away, concealed, or otherwise disposed of, before the necessary proceedings can be had in the civil tribunals for its recovery, the post or detachment-commander will at once cause the same to be seized, and will hold it subject to any legal proceedings that may be instituted by other parties. Persons caught in the act of stealing, or making away with recently stolen public property, will be summarily arrested by the troops, and turned over to the civil authorities for trial.

4050. Q. Under what circumstances may rewards be offered, and what amount is authorized? A. Quartermasters, after they have failed to get possession of a lost or stolen animal by the ordinary means, may authorize the payment of a reward of \$25.00 for its recovery. If the animal has been stolen, they may offer an additional reward of like amount for each person arrested, tried, convicted, and sentenced for the theft.

4051. Q. What will be done when an officer is, by order, leave of absence, or any other cause, removed from the care of public property in his charge? A. The commanding officer, or an officer designated by him, shall receive, receipt, and care for it, until a successor is regularly appointed; and, if it becomes necessary to remove all officers, the commanding officer will take measures to secure it and report the circumstances to the proper authority. When it can be avoided, an officer will not be detailed for duty which will separate him from the public property for which he is accountable.

4052. Q. Who, by virtue of his office, becomes responsible for public property? A. Although an officer who has receipted for public property is pecuniarily accountable therefor, the commanding officer is also responsible for its security, and for the strict observance of the regulations in regard to its preservation, use, and issue. He will therefore see that none but reliable agents are allowed control over or access to it.

4053. Q. What kind of, and how will U. S. property for use in the service be marked? A. Public animals, means of transportation, tools, and all other movable public property that it is practicable to mark, will be conspicuously branded "U. S." before being used in the service.

4054. Q. How will public property lost or destroyed in the mili-

tary service be accounted for? A. By affidavit, or the certificate of a commissioned officer, or other satisfactory evidence.

4055. Q. In case of deficiency of any article of military supplies, on the settlement of the accounts of any officer charged with the issue of the same, what is done? A. The value thereof shall be charged against the delinquent and deducted from his monthly pay, unless he shall show to the satisfaction of the Secretary of War, by one or more depositions setting forth the circumstances of the case, that said deficiency was not occasioned by any fault on his part. And in case of damage to any military supplies, the value of such damage shall be charged against such officer and deducted from his monthly pay, unless he shall, in like manner, show that such damage was not occasioned by any fault on his part.

4056. Q. How may affidavits or depositions be taken, when necessary for government purposes? A. Before any officer in the following list, when recourse cannot be had to any before named on said list, which fact shall be certified by the officer offering the evidence, i.e.: 1st, a civil magistrate competent to administer oaths; 2d, the judge-advocate of a court-martial; 3d, the adjutant of a regiment or post; 4th, a commissioned officer. When affidavits are taken for the interest of the public service, the Quartermaster's Department will pay the notarial fees.

4057. Q. Under what conditions may permanent military buildings be constructed? A. Permanent military buildings will only be constructed under special authority granted by an act of Congress, unless the work or labor connected therewith is performed by troops; and in such case, the authority of Congress must first be obtained if the estimated cost of the building or structure exceeds \$20,000.

#### ARTICLE LX.

4058. Q. What is necessary in order to relieve an officer from liability on account of public property which has been damaged, except by fair wear and tear, or which is believed to be unsuitable for the service? A. It shall, before being submitted to an inspector for condemnation, be examined by a board of survey. Exceptions will be made in cases of animals or other public property infected with contagious disease, which may be summarily disposed of by order of a commanding officer.

4059. Q. How may boards of survey be convened and constituted? A. A board of survey will be convened by the commanding officer of the post or station where it is to meet. It will be composed of three officers, exclusive of the commanding officer and those whose actions and responsibilities are to be inquired into, if that number are present for duty; otherwise, of as many as are so present, exclusive of the commanding and interested offi-

cers; or, if the latter alone are present for duty, then of the disinterested officer. When only the responsible or interested officer is present, he will not constitute himself a board of survey, but will furnish his certificate of facts and circumstances which demand special determination, supported by the affidavits of enlisted men or others who are cognizant thereof, which he will forward to department headquarters.

4060. Q. What duties are imposed upon boards of survey? A. Boards of survey must fully investigate the matters submitted to them. They will call for all evidence attainable, and will not limit their inquiries to the proofs or statements presented by the party or parties in interest. They will rigidly scrutinize the evidence, especially in those cases wherein property is alleged to have been stolen, or embezzled, and will not recommend the relief of officers or soldiers from responsibility for property until it shall be proved that they have fully performed their duty in regard to it. In no case, however, will the report of the board overrule or take the place of the depositions which the law requires.

4061. Q. What will the party responsible for the property to be surveyed in all cases furnish? A. The original certificates or affidavits and the number of duly attested copies thereof required by a board of survey to accompany its proceedings.

4062. Q. What oaths are boards of survey empowered to administer? A. A board of survey has no legal power to administer oaths, either to its members or to witnesses before it.

4063. Q. What powers are conferred upon boards of survey? A. Boards of survey cannot condemn public property. Their action is purely advisory. They are called for the purpose of ascertaining and reporting facts; of submitting opinions and making recommendations upon questions of administrative responsibility, which may arise through accident, mistake, neglect, or unusual act, and which cannot be determined by established rules, in order that the adjustment of accounts may be facilitated. For example, they investigate and determine questions involving the character, amount, and cause of damage or deficiency which public property may have sustained in transit, in store, or in actual use, and which is not the result of ordinary wear and tear, or of some accepted contingency of the service, and report the investigation made, their opinions thereon, and fix responsibility therefor upon the party at fault, whether the carrier, the one having it in immediate charge, or the one called upon to account for the property. They make inventories of property ordered to be abandoned, when the articles have not been enumerated in the orders; recommend the prices at which damaged clothing may be issued to troops, and the proportion in which supplies shall be issued in consequence of damage that renders them, at the usual rate, unequal to the allowance which the regulations contemplate. They verify the discrepancy between the invoices

and the actual quantity or description of property transferred from one officer to another; fix definitely amounts received for which the receiving officer must receipt, and ascertain, as far as possible, where and how the discrepancy has occurred. They inventory and report the condition of property in the possession of deceased officers as provided for.

4064. Q. How many copies of the proceedings of boards of survey must be prepared and what will be done with them? A. The proceedings of a board of survey will be prepared in triplicate and signed by each member. In cases when they are deemed complete by the approval or disapproval of the convening officer, one of the set will be forwarded by him to the headquarters of the department, and the remaining two to the officer whose responsibility they affect. When the action of authority higher than that by which the board has been convened is necessary, all of the set will be forwarded. Upon completion, one will be retained at the place of final action and two will be returned to the responsible officer.

4065. Q. What is necessary to render the proceedings of boards of survey complete? A. When the value of the property submitted for survey, or the loss or damage to be inquired into, does not exceed five hundred dollars, the proceedings of the board will be considered complete upon the approval or disapproval of the convening officer, although they may be revised by higher authority. If such value, or the loss or damage, exceed that amount, the proceedings will be acted upon by the department commander, and if the amount involved be large, they will be forwarded to the division commander for action. If, on examination in the proper bureau, they exhibit serious error or defect, either of investigation or finding, they will be submitted to the Secretary of War for his instructions. In all cases, however, and whatever the amount involved, they shall, upon the request of an officer pecuniarily interested, be submitted to the department commander before they shall be deemed complete for any purpose.

4066. Q. What is done if an inspection of property follows the action of a board of survey thereon? A. A copy of the proceedings will accompany the inventory and inspection report which is transmitted as a voucher to the officer's returns. Another copy of the proceedings and of the inventory and inspection report will be filed by the officer with his retained papers. Whenever a board recommends a stoppage against an enlisted man and the recommendation is approved, the convening authority will cause a copy of the proceedings to be furnished to the man's company commander, who will charge the amount on the next muster and pay-rolls of the company.

## ARTICLE LXII.

4067. Q. What powers are conferred by law upon the Secretary of War? A. The supply, payment, and recruitment of the army, and the direction of the expenditures of the appropriations for its support, are, by law, intrusted to the Secretary of War. He exercises control through the bureaus of the War Department. He determines where and how particular supplies shall be purchased, where they shall be delivered, inspected, and stored, and how distributed.

4068. Q. How are assignments of officers and men of the staff departments made? A. The assignment to stations of officers or enlisted men of the staff departments, except as provided in the regulations for troops in campaign, will be made by the Secretary of War, through the General of the Army, or by commanders of geographical divisions and departments, under the special authority of the War Department. The commander of a department, who, in consequence of the movement of troops, or other necessity of service, removes an officer from the station to which he has been assigned by the Secretary of War, will promptly report the case to the Adjutant-General.

4069. Q. What will be done when chiefs of staff departments desire to change the stations of officers or enlisted men belonging thereto, or to send them on duty peculiar to their own departments? A. Such chiefs shall (except in cases of officers employed under the appropriation for the improvement of rivers and harbors, and of enlisted men belonging to the Signal Corps or detailed to duty therewith) make application, through the Adjutant-General, to the Secretary of War, setting forth the reason for the change or the purpose of the journey, when, should the Secretary assent, the proper orders will be issued.

4070. Q. Under whose control are the staff officers assigned to the command of a general or other officer. A. They are under his supervision and control in all matters pertaining to or affecting the command not specially excepted therefrom by the regulations or orders of the War Department.

4071. Q. To whom must officers of staff departments, or officers doing duty therein at military posts, submit their requisitions for supplies or property, and estimates for money? A. To their immediate commanding officers for revision and approval, prior to forwarding them.

4072. Q. What is required of the chief of each branch of the staff of any command regarding estimates? A. He will carefully revise all estimates for money and requisitions for supplies for his department. In acting upon them he will ascertain and be guided by the cheapest markets and most economical routes of transportation. Such officers should receive from their commanders timely instructions as to all contemplated movements of

troops, and as to any probable increase or diminution of the garrison at any particular post, that a proper and economical distribution of the supplies may be made.

4073. Q. What estimates will officers of the staff departments assigned to the charge of general depots, or to the duty of purchasing supplies for troops not included in the military department in which they are located, submit to the department commander? A. Such estimates only as relate to the service under his command. In all other matters they will communicate directly with the chiefs of their bureaus in Washington.

4074. Q. How will every order issued by any military authority, which may cause an expenditure of money in a staff department, be given? A. In writing. One copy thereof will be forwarded, by the officer receiving it, to the head of his department; the other will be filed by the disbursing officer with his voucher for the disbursement. If the expenditure is disallowed, it will be charged to the officer who ordered it.

#### ARTICLE LXVIII.

4075. Q. With what duty is the Quartermaster's Department charged? A. With the duty of providing the means of transportation of every character, either under contract or in kind, which may be needed in the movement of troops and material of war. It furnishes all Government animals employed in the service of the Army, the forage consumed by them, the wagons and all articles necessary for their use, with the exception of the equipment of cavalry and artillery. It furnishes clothing, camp and garrison equipage for the troops, the shelter and buildings for them and for the stores which they require, constructs and repairs roads, railways, and bridges needed for military purposes, builds and chartered ships, boats, docks, and wharves, and, finally, attends to all those matters connected with military operations which are not expressly assigned to some other bureau of the War Department.

4076. Q. Where are general depots for the collection, manufacture, and preservation of quartermaster's stores, until they are required for distribution, established, and under whose control are they? A. They are established in different sections of the country. They are under the immediate control of the Quartermaster-General. For the protection and preservation of stores belonging, or already issued, to a particular military division or department, its commander will exercise control so far as his command is interested in such property. In all other matters the officers in charge act under the sole direction of the Quartermaster-General.

4077. Q. What will the Quartermaster's Department provide, in all permanent barracks, for the use of enlisted men? A. A



box or locker for each enlisted man, in which to store his full-dress uniform and extra clothing. Each man will provide his own padlock. Chairs will be supplied for enlisted men in barracks, at a rate not exceeding one for each non-commissioned officer and one for every two enlisted men of other grades. Bunks, benches, chairs, tables, lockers, and other articles of furniture provided for soldiers' barracks, will not be removed therefrom without the order of the post-commander, nor will they be removed from a post or station except by order of the Quartermaster-General.

4078. Q. What annual inspection is made by the commanding officer and quartermaster at military posts, and for what purpose? A. An annual inspection of the public buildings at the several posts will be made on the 31st of March by the commanding officer and quartermaster, and immediately thereafter the quartermaster will submit a report showing the condition and capacity of the buildings, and the character and extent of any additions, alterations, and repairs that have been made upon them during the year closing with the inspection, with the cost of the same; also the additions, alterations, and repairs that are needed, with plans and estimates thereof in detail. Whenever the 31st of March falls on Sunday, the inspection will be made the following day. The commanding officer will examine the report and estimates, and forward them, with an expression of his views, through the proper channel, to the Quartermaster-General.

4079. Q. When private buildings occupied as barracks or quarters, or lands occupied as encampments, are vacated, what is done? A. The commanding officer and quartermaster will make an inspection of them, and the latter will report, through the prescribed channels, to the Quartermaster-General, their condition, and any injury which has resulted to them by reason of such occupancy.

4080. Q. What is required regarding the numbering of buildings at a post? A. Every public building at a military post will be numbered by the post-quartermaster, and each new building constructed will be given its proper numerical designation. All buildings shall retain permanently the numbers originally given, which shall be entered by the post quartermaster in a book, to be retained in his office as a permanent and continuing record. Against each building he shall charge all expenditures made thereon, noting the sums authorized, the authority therefor, and the amounts actually expended carefully itemized, showing separately the sums paid for material and labor. All expenditures made for the erection of new buildings, as well as for additions, alterations, or repairs of others, will be so entered that the book will accurately exhibit the cost of each building to date.

4081. Q. By whom will quarters at military posts be allotted?

A. The post-quartermaster, under the direction of the commanding officer, will allot to each officer the quarters to which his rank entitles him.

4082. Q. If there are officers on duty without troops, at stations where there are public quarters, how will they be provided for? A. They will be furnished quarters in kind. If, however, the quarters are insufficient, the Quartermaster's Department will hire those necessary for the officers who are unprovided for.

4083. Q. To what extent may an officer on sick-leave hold his quarters? A. An officer on sick-leave is entitled to public quarters at his station during the period of sick-leave, not exceeding six months, provided he or his family actually occupy them. He can only hold hired quarters, however, while he is personally an occupant.

4084. Q. How are officers supplied with fuel? A. Officers may purchase the fuel actually needed for their own use from the Quartermaster's Department. For the quantity allowed them they shall pay at the rate of three dollars per cord for standard oak-wood, or its equivalent in other kinds of fuel, as determined by the Quartermaster-General. For any additional quantity they shall pay the contract price, or three dollars per cord, if the contract price is less than three dollars. This privilege shall not extend to retired officers. The Quartermaster's Department may sell fuel to contract-surgeons and to the families of officers who are temporarily absent.

4085. Q. What are the regulations governing the sale of fuel to officers? A. Officers who desire to purchase fuel of the Quartermaster's Department will make requisition therefor. Payment will be made at the time of sale, and the purchasing officer will be given a receipt for the amount paid. The law permits the sale to officers of such fuel only as they actually use. They have no right to sell, barter, exchange, or dispose of it. Fuel will be sold only on the officer's certificate that it is for his personal or family use. An officer may procure by purchase from the Quartermaster's Department one sixth of his allowance of fuel in kindling-wood, which will be issued as equivalent in quality to standard oak-wood.

4086. Q. What is the standard by which fuel is issued or sold? A. Merchantable oak-wood is the standard; the cord is 128 cubic feet. A scale of equivalents, to govern in the issue and the sale of fuel, is published from time to time in general orders.

4087. Q. What provision is made for the issue of fuel to troops? A. Fuel issued to troops is public property. Any portion not actually consumed by them shall be returned to the quartermaster and taken up on his quarterly return. Fuel so issued, however, and not consumed in quarters, may be used in baking the soldiers' bread; and at any post where coal is used for fuel exclusively, the Quartermaster's Department may, upon

the request of the post-commander, provide, as part of the fuel allowance, an equivalent of wood in lieu of coal sufficient for the post-bakery. Fuel will be issued only in the month when due. The cheapest fuel at the place of issue will, all things considered, be furnished.

4088. Q. Under what circumstances may an increase of fuel allowance be permitted, and what is required of the quartermaster in this case? A. If at a military post, situated between the 36th and 43d degrees of latitude, the mean temperature for twenty consecutive days of any calendar month is not above 20 degrees Fahrenheit, an increase of fuel of one third instead of one fourth, as shown in the table, shall be allowed. If the temperature is not above 10 degrees, an increase of one half shall be allowed, whatever the latitude of the place. When an increased issue is made under the preceding paragraph, the certificate of the post-surgeon as to the mean temperature, and the order of the post-commander for the issue, will be filed with the "Abstract of Issues."

4089. Q. What kind of illuminating supplies are provided for posts, and how are matches furnished? A. The Quartermaster's Department provides electric-lights, lamps, lanterns, mineral oil, wicks, and lamp-chimneys. Matches are purchased by the Quartermaster's Department from the Subsistence Department, and issued in such quantities as commanding officers may order and certify as necessary for the purpose.


4090. Q. How is the issue of illuminating supplies regulated? A. By the department commander, upon the recommendation of the post-commander.

4091. Q. How frequent should requisitions be made for illuminating supplies at posts? A. Once each month.

4092. Q. How is stationery issued by the Quartermaster's Department? A. That for individual officers upon requisition made once each quarter; that for commands upon requisition by the commander of the organization, approved by the post-commander; that for courts and boards on requisition of the judge-advocate or recorder, approved by the presiding officer.

4093. Q. How are animals provided for the army? A. Purchase of horses for the cavalry and artillery, for Indian scouts, and for such infantry as may be mounted, shall be made by contract, after competition duly invited by the Quartermaster's Department, and an inspection by such department, all under the direction and authority of the Secretary of War.

4094. Q. What, in brief, should be the character of horses purchased for the cavalry? A. The cavalry horse must be sound, free from vicious habits, gentle under the saddle, with free action at the walk, trot, and gallop; a gelding of uniform and hardy color; in good condition; from fifteen to seventeen hands high; weight not less than 900 nor more than 1200 pounds; from five



to nine years old ; head and ears small ; forehead broad ; eyes large and prominent, vision perfect in every respect ; shoulders long, and sloping well back ; chest full, broad, and deep ; fore-legs straight, and standing well under ; barrel large and increasing from girth toward flank ; withers elevated ; back short and straight ; loins and haunches broad and muscular ; hocks well bent and under the horse ; pasterns slanting and feet small and sound.

4095. Q. What kind of horses should be provided for the artillery? A. The artillery horse must be sound ; free from vicious habits ; a square trotter, well broken to harness ; a gelding of uniform and hardy color ; in good condition ; from fifteen to seventeen hands high ; weight of the lead-horse not less than 1050 pounds, and that of the wheel not more than 1300 pounds ; from five to nine years old ; full-chested ; shoulders sufficiently broad to support the collar, but not too heavy ; full-barrelled, with broad, deep loins, short coupled with solid hind-quarters ; feet sound and in good order. Long-legged, loose-jointed, long-bodied, and narrow-chested horses, as well as those which are restive, vicious, or too free in harness, are to be rejected.

4096. Q. What kind of mules should be provided for the military service? A. They should be strong, stout, compact ; sound and kind ; free from defects in every particular ; from four to nine years old ; from 850 to 1200 pounds in weight ; from fourteen to sixteen hands high, and suitable in all respects for the transportation service of the army. If for draft purposes, they are to be well broken to harness ; if for pack purposes, they need not be broken, and the standard of height may be reduced to thirteen and a half hands, if the animals be in other respects suitable.

4097. Q. How will animals purchased for the Government be marked? A. Every animal will be branded with the letters " U. S.," on the left fore-shoulder, on the day he is received.

4098. Q. What kind of record must be kept of public animals? A. A complete descriptive list will be made of each animal at the time of purchase, which will accompany him wherever he may be transferred, and a descriptive-book shall be kept with every troop of cavalry, and battery of light artillery, and with the records of every officer responsible for public animals. It shall contain a description of every animal received and transferred, showing the kind, name, age, size, color, marks, brands, or other peculiarities of each ; how and when acquired and disposed of ; the name of its rider or driver, and the particular use to which it is applied.

4099. Q. What is done when public animals are issued or transferred? A. The person in charge shall be provided with full descriptive lists, which will be delivered to the receiving officer at

time of transfer, by whom they will be taken up in his descriptive book of public animals.

4100. Q. How will public animals be cared for? A. Public animals will be habitually assigned to their riders or drivers, who shall not exchange or surrender them to the use of any other person without the permission of the company commander, quartermaster, or other officer responsible for them. Every animal's feet shall be examined by his rider or driver after each day's work, to ascertain whether the shoes are in good order. Should any defect be discovered, the fact will be reported to the officer responsible. A farrier should examine each animal's feet twice a week, to replace broken nails, fasten loose shoes, and reduce projecting clinches. The appearance of thrush or any unhealthy condition of the feet will be reported without delay to the officer responsible for the animal.

4101. Q. Under what circumstances may public animals be condemned and disposed of? A. Public animals will not be condemned for temporary disease, or want of condition, when they may be expected to recuperate, within a reasonable time, by rest and treatment. Horses and mules inspected and condemned as unfit for service will be advertised for sale, and disposed of within ten days from date of advertisement.

4102. Q. How and for whom are veterinary medicines supplied? A. Veterinary medicines, instruments, and supplies for the treatment of all public animals, and the authorized private horses of mounted officers, are furnished by the Quartermaster's Department.

4103. Q. What is the forage-ration for public animals, and when may it be increased or diminished? A. The forage-rations for a horse is fourteen pounds of hay and twelve pounds of oats, corn, or barley; for a mule, fourteen pounds of hay, and nine pounds of oats, corn, or barley. In special cases of hard service or exposure, the Quartermaster-General may authorize the grain-ration to be increased not to exceed three pounds, when recommended by the chief quartermaster of a department, or of an army in the field. Division and department commanders will reduce the forage-ration, when necessary, to keep purchases within the remittances made to liquidate them. In localities where good grazing is practicable for a considerable portion of the day, or during seasons when little labor is required of animals, commanding officers will order a judicious reduction of the forage-ration, bearing in mind however the fact that the animals should always be kept in condition to perform the service for which they are intended. Whenever the state of the supplies or circumstances make it necessary to reduce the forage-ration, commanding officers will direct what part of the same shall be issued.

4104. Q. When and under what conditions will forage be fur-

nished to officers? A. Forage in kind will be issued only during the month when due. It is only furnished to officers for the horses owned and actually kept by them in the performance of their official duties, when serving with troops in the field or at military posts and stations, and for the following number of horses: To the Lieutenant-General, four; to a major-general or a brigadier-general, three; to a colonel, lieutenant-colonel, major, captain, or lieutenant, mounted, and adjutant and regimental quartermaster, each two.

4105. Q. How will the deliveries of fuel and forage be made by contractors, and for what purpose? A. Deliveries under contract will be made monthly, when practicable, in order to avoid unnecessary accumulation at posts and to distribute expenditure throughout the year. Hay and straw will be carefully stored in barns provided for that purpose, or properly stacked. The stacks will be raked down so as to shed the rain freely. The tops should be covered, if possible, with old canvas, kept in place by poles or ropes weighted at their lower ends. If canvas cannot be had, the stacks will be thatched.

4106. Q. What is to be done with grain, hay, straw, and coal when received? A. They will be carefully weighed. Hay-scales for this purpose will be supplied upon proper requisition to any established post. Wood will be carefully piled, and measured or weighed.

4107. Q. What is the Government standard weight of grain per bushel? A. There is no Government standard weight of grain per bushel. The weight is a matter of state regulation. Short forage should be contracted for by the hundred pounds; but when a contract for grain is made by the bushel, the number of pounds per bushel will be specified in the contract.

4108. Q. When should fuel, forage, and straw be verified? A. At the end of each quarter, and also when transferring to successor, verify by actual weight or measurement, the quantities actually on hand. In case of transfer, the verification will be made in the presence of the relieving officer.

4109. Q. How can the quantity of hay and straw in stack be determined? A. If the hay and straw are in stack, the quantities can be determined by ascertaining the cubical contents of the stack, then cutting therefrom a cube of definite size, not less than seven feet, and weighing it. The quantities of hay and straw in barns will be ascertained in a similar manner.

4110. Q. How may the quantity of grain and coal on hand be ascertained? A. By weight or measurement. If in a bin, the number of pounds can be determined by measuring the bin, allowing 2150.42 cubic inches, or 1.245 cubic feet, of space to the bushel, and then allowing fifty-six pounds weight to a bushel of corn, forty-eight to a bushel of barley, and thirty-two to a bushel of oats; or, if there are scales at the post, the actual number of

pounds of grain on hand may be ascertained by weighing accurately ten or more bushels of it, and then using the actual instead of the standard weight in the computation. If coal is to be determined by measurement, the quantity on hand in cubic feet, and the weight of a cubic foot, will be ascertained.

4111. Q. What will be done in case excess or deficiency between actual and reported quantities of supplies shall be found to exist by the directed verification? A. A board of survey will be called, which shall determine discrepancies, fix responsibility therefor, and recommend what quantities shall be taken up or dropped. In case of deficiency, the board will make full investigation of the facts, which it will report, together with its conclusions as to cause for the same, with such recommendations as it may deem to be warranted.

4112. Q. In what way may sales of public horses be made to officers? A. In the field, on the frontier, or in active service, sales of horses held in the Quartermaster's Department for issue, sale, or keeping, may, with the approval of the General commanding the Army, or on the authority of the Secretary of War, be made to mounted officers. Horses belonging to troops of cavalry and to batteries of artillery will not be sold; nor shall they be turned in to the Quartermaster's Department without being previously inspected and condemned as unserviceable.

4113. Q. Under what conditions may horses belonging to officers be transported? A. The Quartermaster's Department will transport, for officers changing station, the number of horses for which they are legally entitled to forage, provided such horses are owned and actually used in service by them. The expense paid by the United States shall not exceed \$50 for each horse transported. If the change of station is to effect a voluntary transfer, no expense for transportation of animals will be allowed.

4114. Q. By whom is the allotment of draught and pack animals to each military division fixed? A. By the Quartermaster-General under the direction of the Secretary of War, and division commanders will allot the same to the several departments composing their commands.

4115. Q. What governs, in the transportation of persons and property? A. In providing transportation for persons and property the public interests will govern as to the route. As a rule, the shortest practicable travelled route will be adopted. A longer route may be used to secure lower rates when the time consumed will not be detrimental to the public interests. When there are competing routes which furnish equal facilities, advantages, and rates, each will be given a proportional share.

4116. Q. How are ambulances for sick and wounded provided? A. The Quartermaster's Department will procure the necessary ambulances for transporting the sick and wounded, upon the requisition of the proper medical officer.

4117. Q. What is every expedition having a wagon-train required to take with it? A. A supply of horse and mule shoes, a smith's bellows, a set of smith's tools, spare iron enough to make ordinary repairs; in case there is no smith or farrier attached to the command, one of the civilian smiths at the post will accompany the train.

4118. Q. When troops are moved, how will transportation be provided? A. For the whole command. Proper orders in the case, and exact return of the command, will be furnished to the quartermaster who is to provide the same.

4119. Q. What is required in order to secure transportation for persons in the military service? A. Every person requiring transportation must show that he is entitled to it by an order from competent authority, a certified copy of which will be made by the quartermaster who furnishes the transportation, and filed with the records of his office. The latter will indorse on the order, over his signature, the fact that transportation has been provided, the places from and to which it has been provided, and the number of pounds of extra baggage transported, if any. The order will be retained by the party who receives the transportation.

4120. Q. What is done to avoid delay in movement of troops? A. The quartermaster who provides the transportation will notify by mail or telegraph, as may be required, the quartermasters at places where changes of route are to be made, or means of transportation are to be changed, of the day on which the troops will start, their route, destination, the number of officers, enlisted men, and animals, and the quantity of public property and baggage for which transportation will be required.

4121. Q. What will officers of the Quartermaster's Department issue to each carrier, over whose road or line transportation is required for troops or individuals (except as otherwise provided)? A. A request, setting forth date and place of issue; time for which it will be valid; name of company required to furnish transportation; name of the person, or of the one in charge of the party to be transported, with number thereof, pounds of extra baggage, if any; company and regiment to which person belongs, if an officer or enlisted man; the places of original departure and ultimate destination, with the initial letters of each road or line to be used on the journey.

4122. Q. What is to be stated on the back of transportation requests? A. The officer issuing the request shall state on its back by what authority it is issued, giving the number, date, and place of issue of the order requiring transportation to be furnished, and the nature of the journey, or purpose for which it is to be performed.

4123. Q. What is required of the party using transportation requests? A. Requests should be properly receipted by the party named therein, and tickets procured thereon, whenever it can be



done, before commencing the journey ; otherwise they will be given to the conductor of the train, or agent of the carrier. If more than one person is to be transported, the officer or person in charge of the party, in filling the receipt, will state the number of the persons and pounds of extra baggage actually carried, and the class and description of transportation actually furnished. In no case will a receipt be given for transportation of a greater number of persons, or a greater number of pounds of extra baggage, than the request calls for.

4124. Q. What is to be done with unused tickets or parts of tickets ? A. All unused tickets or parts of tickets, procured on transportation requests will be returned to the officer who issued the request, and the value thereof will be deducted from any money due, or to become due, the company for which they were obtained. On the collection of the value of such unused tickets they will be returned to the company by which they were issued.

4125. Q. Whenever it shall be necessary for troops, Government teams, or employés in the military service to pass on public duty over a legally constituted toll-bridge, ferry, or turnpike, what will the commander or the party in charge do ? A. He will apply to the nearest officer of the Quartermaster's Department for a request for such passage. If he cannot obtain it, he will give to the agent of the ferry, bridge, or turnpike a certificate stating the number of persons and whether mounted or on foot, the number of loose animals, the number of teams, and the number of animals to each team, for which toll or ferriage should be paid, and setting forth that the travel is on public duty.

4126. Q. To whom will accounts for ferriage, toll-roads, etc., be presented for payment ? A. To the nearest disbursing quartermaster. Before payment, the latter will satisfy himself that the rates charged do not exceed those authorized or paid by private individuals, and that the indebtedness was necessarily incurred for the public service. Payment may be made at the authorized or usual rates, unless more favorable terms can be obtained by special agreement.

4127. Q. Under what conditions are sleeping and parlor car accommodations furnished by the Quartermaster's Department ? A. Officers of the Army travelling on duty with troops, clerks and agents in the military service travelling under orders on public business, sergeants of the post, non-commissioned staff, hospital stewards, and non-commissioned officers of like grade, sergeants of the Signal Service, and general-service men, when travelling on duty without troops, and, when necessary, invalid soldiers travelling under orders, will be allowed one double berth in a sleeping-car, or the customary stateroom accommodations on boats, and steamers where extra charge is made for such accommodations. Officers of the Army travelling as aforesaid shall also be allowed one seat in a day parlor-car. Officers when travelling

without troops are also allowed the cost of one double berth for each night only of a continuous journey.

4128. Q. What is the allowance of baggage for officers to be transported at public expense? A. In the field: major-general, 1000 pounds; brigadier-general, 700; field-officer, 500; captain, 200; first-lieutenant, 150; second-lieutenant, 150; acting assistant-surgeon, 150; veterinary surgeons, 150. In changing stations: major-general, 3500; brigadier-general, 2800; field-officers, 2400; captain, 2000; first-lieutenant, 1700; second-lieutenant, 1500; acting assistant-surgeon, 1200; veterinary surgeons, 500; post and regimental non-commissioned officers, etc., 500.

4129. Q. What is the object of having quartermaster's stores sealed, weighed, and plainly marked when turned over to carriers for shipment? A. To protect the Government from loss while stores, boxed or baled, are in the hands of carriers; also to trace responsibility when such boxes or bales remain in Government storehouses at military posts and stations, and are transferred unopened by one officer to another.

4130. Q. When is an officer relieved from responsibility in the shipment of stores? A. An officer who turns over stores to another for transportation in the best condition in which it is possible for him to put them, is relieved from any further responsibility therefor by the receipt of the officer to whom they are intrusted for transportation.

4131. Q. When a quartermaster receives stores, transported by a common carrier, under agreement with the Quartermaster's Department, which do not correspond with the invoice because of damage or deficiency not attributable to ordinary loss or wastage, what is done? A. The fact shall be fully investigated by a board of survey, unless the carrier voluntarily assumes liability for the loss, and the money value of the damage or deficiency shall be charged to the party responsible therefor, whether the shipping-officer or carrier. In case the responsibility is fixed upon the carrier, the receiving-officer shall note on the bill of lading the deductions which should be made for such loss or damage, by the quartermaster who pays the accounts, by whom the deduction will be made and the amount stopped refunded to the proper department. A copy of the proceedings will accompany the bill of lading.

4132. Q. When and under what conditions may funds be shipped by express? A. Whenever it becomes necessary to send to the chief quartermaster or chief commissary of subsistence of a department, or to the nearest public depository, the quartermaster's or subsistence funds which have accumulated at a post remote from any public depository, they may be transported by express, if there be no other safe way of sending them. Application for authority to transport the funds will be made, through the chief quartermaster or chief commissary of subsistence, to the depart-

ment commander, and if granted, the transportation will be furnished in accordance therewith.

4133. Q. For what particular departments of the Government and for what institutions may the Quartermaster's Department ship stores? A. Any of the executive departments of the Government; also donations to the medical museum at Washington; the library and museum of the Military Service Institution at Governor's Island, N. Y.; the U. S. Military Academy at West Point, N. Y.; and articles purchased with hospital or company funds, provided the articles are purchased at the nearest accessible market.

4134. Q. By what means will property be transported? A. On bills of lading.

4135. Q. How will bills of lading be numbered, how prepared, and what must they show? A. The bills as issued will be numbered consecutively from one upwards, in the order of the date of shipment—numbers beginning with the first shipment of the fiscal year, and ending on the 30th of June, the end of that year. They will consist of two parts, the original and duplicate, each to be certified by the shipping-officer and receipted by the carrier. They will be prepared in the name of the carrier, and will show the points between which transportation is required; also places of original departure and ultimate destination of the freight, and will show the number, marks, contents, and weight or measurement of each package or class of packages to be transported.

4136. Q. What will be done with the bills of lading? A. The original will be given to the carrier at the time the shipment is made; and, upon the delivery of the property in good order and condition, will be receipted by the consignee and returned to the carrier, with such further indorsement as may be necessary to insure settlement for the service. The duplicate will be promptly transmitted by mail, or otherwise, by the shipping-officer to the officer to whom the stores are consigned; and upon delivery of the property will be receipted by the latter in like manner as the original, and forwarded to the paying-officer, to be used in settlement for the service. If the shipping-officer is not the paying-officer, he will be notified by letter of the receipt of the stores, and their condition when received.

4137. Q. In case of loss or damage to public property while in possession of the carrier, what is done with the bills of lading? A. They will not be receipted until such loss or damage is decided upon, and the responsibility therefor fixed; except that when the loss or damage has been ascertained and the responsibility fixed without the action of a board, the bill may be receipted and an indorsement made thereon stating the kind of property lost or damaged, its weight or measurement, and full value, including transportation, and the name of the company or party responsible therefor; also, that when a receipted bill of lading is de-

manded by the carrier, it may be receipted by the receiving officer, after noting thereon the loss or damage which is apparent, and adding that final settlement will await the action of the board of survey. All the indorsements that are made by the receiving officer on the original bill of lading will be put upon the duplicate.

4138. Q. How will payments be made on bills of lading? A. Payment will be made on the original bill of lading properly receipted and accomplished, but not until the duplicate has been received by the paying-officer, except as provided for.

4139. Q. What is done in case of the loss or destruction of one or more parts of the bill of lading? A. In case of the loss or destruction of one part of the bill of lading, the paying-officer, after satisfying himself of the fact, will, if he does not know any good reason to the contrary, report it to the Quartermaster-General, with recommendation that payment be made for transportation on the part in his possession. The Quartermaster-General, being satisfied that payment should be made, will authorize it as recommended. In case both parts of the bill of lading have been lost or destroyed, the shipping-officer will, upon the application of either the carrier, the consignee, or the paying-officer, issue certificate to him.

4140. Q. Under whose direction are all matters pertaining to the transportation of troops, munitions of war, equipments, military property and stores, involving the use of land-grant and bond-aided railroads? A. They are under the direction of the Quartermaster-General of the Army, who will exercise general control and supervision of the officers of the Quartermaster's Department in their duties, so far as they relate to Army transportation and the preparation of accounts for such service.

4141. Q. How often will estimates of clothing and equipage be made? A. Estimates of clothing and equipage, based on the organic strength of the command and stating the quantities and sizes of articles required, will be made by the commander of each company or separate detachment in the early part of each calendar year. Any estimate for more than ten per cent in excess of the annual allowance must contain full explanation of the necessity therefor.

4142. Q. What will be done regarding the clothing for troops if a change of station is ordered? A. If, at the time estimates are prepared, it be known that troops are to change stations, their estimate will not be included in the post or consolidated estimates, but will be forwarded separately. The new station to which the supplies are to be sent should be distinctly given.

4143. Q. Should the quantity of clothing and equipage supplied upon the annual requisition prove inadequate, what may be done? A. A special requisition, giving reasons therefor in detail, should be made and forwarded, through the proper channels, to the Quartermaster-General.

4144. Q. What kind of unmade clothing may be issued to enlisted men, and how is it obtained? A. Unmade uniform coats, blouses, and trousers may be issued to enlisted men at cost of materials. They will be obtained from the Quartermaster's Department in the same manner as other articles of clothing. The materials for each coat, blouse, or pair of trousers, with the buttons, thread, needles, and all necessary trimmings, will be rolled in a bundle, which will be securely fastened and marked with the size of the garment.

4145. Q. When unmade articles of clothing received by officers at military posts are found to be incomplete, but otherwise in good condition, what is done? A. They will not be submitted to an inspector for condemnation, but will be turned over to the nearest manufacturing depot to be completed; or a requisition for the missing parts may be made.

4146. Q. What is done with the clothing estimated for by each company or detachment commander? A. It should, as a rule, be held subject to its wants; but, in case of need, it may be otherwise issued, and the post-quartermaster will then call for a sufficient quantity to replace it, if the state of his supplies so require.

4147. Q. By whom will clothing be issued to enlisted men, and when are their accounts to be settled? A. Clothing will be issued by company commanders; but this does not apply to men of the Signal Corps at isolated stations and to soldiers on detached duty; the receipts of these two classes of men being passed as vouchers to the returns of the issuing officer. The company or detachment commander will settle the clothing accounts of all men of his command on June 30th and December 31st of each year, except certain cases prescribed in circular No. 6, A. G. O. 1889.

4148. Q. How may officers of the Army provide themselves with uniform clothing and materials? A. Officers of the Army may purchase from the post-quartermaster, at the regulation prices, such articles of uniform clothing, clothing materials, and equipage as they actually need, provided the property is available. They should certify that it is intended for their personal use.

4149. Q. What articles are officers permitted to drop from their returns on certificates, and what should those certificates specify? A. Officers are authorized to drop from their returns of clothing, camp, and garrison equipage, tent-pins, and axe, pick-axe, and hatchet-helves, upon their certificates that they have been worn out in service. Service chevrons, when issued, will be dropped from returns, and will not be charged in the clothing-account of the soldier.

#### TELEGRAPHING AND TELEGRAPH ACCOUNTS.

4150. When will the telegraph be used? A. The telegraph will only be used in cases of urgent and imperative necessity, in which

the delay consequent upon transmission by mail would be prejudicial to public interests.

4151. Q. What accounts for telegrams on military business will be paid, and by whom? A. Accounts for telegrams on military business prepared in the name of the proper telegraph company, will, with the following exceptions, be settled and paid by the Quartermaster's Department: (a.) Accounts for telegrams which pass over any of the lines constructed and operated along the bonded Pacific railroads. (b.) Accounts for reimbursement of accounts paid by officers of the Army for telegraphic service, which will be prepared upon Form No. 13 $\frac{1}{2}$ . (c.) Accounts for telegrams on public business of a confidential nature where, in the opinion of the officer receiving or sending them, it is improper that copies should accompany the accounts, or where copies cannot be procured; or where it is questionable whether the telegrams are on official business or that the telegraph should have been used.

4152. Q. When will explanatory letters for telegraphing accompany the accounts of officers? A. When the originals or certified copies of the telegrams are furnished with the accounts, or when it is questionable whether the telegrams are on official business, or that the telegraph should have been used, an explanatory letter from the officer who sends, or the officer who receives, the telegram will accompany the account.

4153. Q. In framing telegrams what words will be omitted? A. All superfluous words not important to the sense of the communication will be omitted. The last name of the officer addressed, or his title, and the last name of the officer sending the telegram, are generally sufficient for the purpose in view, and officers are enjoined to be discreet in using as few words as possible to convey the message intelligibly.

4154. Q. By whom are telegraphic accounts paid? A. In each military department an officer of the Quartermaster's Department will be assigned, by the department commander, to the duty of adjusting and settling telegraph accounts, under the instructions of the Quartermaster-General; and, so far as possible, arrangements should be made to have all such accounts which may accrue in each department presented to the officer so assigned, who will prepare and pay them, or forward them for payment, as the case may require. At independent posts, or depots, the officer of the Quartermaster's Department there serving will perform this duty.

4155. Q. How is an account for telephoning paid? A. In cases where telephoning is possible—there being no telegraphic communication between the points—an account for telephoning may be paid from the appropriation for the payment of telegrams.

## RECORDS.

4156. Q. What books will be kept in the office of every officer performing duty in the Quartermaster's Department? A. 1. A cash-book, in which will be entered, according to appropriations, all amounts received and disbursed, the date thereof, from whom received or to whom paid, and on what account. 2. A book of letters received, including a record of indorsements. 3. A book of letters sent, in which will be entered in full all letters written from, and pertaining to, the duties of, the office, including estimates for funds and requisitions for quartermaster's supplies. 4. A record-book of barracks and quarters, kept as directed in paragraph 1075. 5. A descriptive book of public animals, kept as directed in paragraph 1132. 6. A record of interments (in case of station at a military post), kept as directed in paragraph 592. 7. A book of stores and property shipped, kept as provided in paragraph 1321. 8. A book of stores and property received, kept as provided in paragraph 1322.

4157. Q. Where will the quartermaster's books be kept, and who is required to see that they are properly kept, etc.? A. They will not be removed from the office except on its discontinuance, when they will be forwarded to the Quartermaster-General. Commanding officers and inspectors will see that they are neatly kept, and contain complete and correct records of all matters which should be recorded therein. Commanding officers will also see that they are properly transferred by officers relieved to their successors.

4158. Q. For what purpose is the book of stores and property shipped kept? A. In the book of stores and property shipped will be entered each shipment, with number and date. The number and date will correspond to the number and date of the bill of lading, and the carrier or agent in receipting will write his name on the line on which the number and date are entered. Should it be attended with risk, or great inconvenience, for the shipping-officer to obtain the signature of the carrier or his agent, that officer will certify to the shipment, and state that the bill of lading was signed by A. B., carrier or agent. The names of the officers to whom the stores are shipped, and where, and from whom, will be entered in their appropriate places; and when the stores are consigned to an agent of a connecting-line, or to a quartermaster or agent of the Quartermaster's Department, to be forwarded to ultimate destination, the name of the agent or officer, and the initial letters of the line he represents, will be given so far as practicable. The kind of conveyance, whether by rail, boat, or wagon, and the name or initial letters of each railroad, or the general route by which the stores are shipped, as shown by the bill of lading, and the name of the contractor, if there be one, will be entered in its proper column. A full and complete list of

all stores shipped as entered on the bill of lading, with the weight or measurement, rates and remarks, will be entered in the book, and any other matters that are necessary to show the condition in which the stores are shipped.

4159. Q. For what purpose is the book of stores and property received kept? A. In the book of stores and property received will be entered each invoice of stores received, with number and date; the number will correspond to the number of the bill of lading, and the officer in receipting will write his name on the line on which the number and date are entered. The names of the officers by whom the stores were shipped and whence, to whom shipped and where, and for whom, will be entered in their appropriate places. The kind of conveyance, whether by rail, boat, or wagon, and the name or initial letters, of each railroad, or the general route by which the stores were transported, as shown by the bill of lading, will be entered in its proper column. A full and complete list of all stores received, as stated on the bill of lading, with the weight or measurement, rates, and remarks, will be entered; also all other matters that may be necessary to show the condition in which the stores are received.

4160. Q. What is done with the letters received by accounting officers? A. All letters received and copies of all orders for the expenditures of money or property, will remain on file as part of the records of the office. When it is necessary to withdraw a letter for file with the officer's accounts, a duly certified copy will be made to replace it in the office-file. Letters pertaining exclusively to the settlement of an officer's accounts belong to him and not to the office-files.

#### RETURNS AND REPORTS.

4161. Q. What returns and reports will be made by all officers in the Quartermaster's Department? A. Statement of public funds; report of persons and articles employed and hired; list of persons and articles employed and hired and transferred; roll of enlisted men employed on extra duty; consolidated report of Government troops and stores transported; statement of outstanding debts; quarterly returns of quartermaster's stores and C. C. & G. E.

4162. Q. When one officer relieves another as quartermaster, how are receipts entered? A. The transferring officer will not enter the receipt for quartermaster's stores upon the abstract, but directly on the return, as "transferred to successor." The receiving officer, in such case, may enter the invoice upon the returns as "on hand at the post, received from predecessor."



## ARTICLE LXXIX.

## SUBSISTENCE DEPARTMENT.

4163. Q. What does the Subsistence Department provide?

A. The Subsistence Department, under direction of the Secretary of War, provides for the distribution and expenditure of the money appropriated for the subsistence of the Army, and for the purchase, issue, and sale of subsistence supplies. This department also furnishes, for sales to posts, such seed, potatoes, and garden-seeds as are necessary for the cultivation of gardens. It furnishes, builds, and repairs ovens for baking bread for the troops, but not bake-houses. When a bakery is not managed by the Subsistence Department, the expenses for hops, yeast, hire of bakers, etc., are paid from the bakery-savings.

## SUBSISTENCE SUPPLIES.

4164. Q. What do subsistence supplies comprise? A. 1. Articles composing the ration, or those authorized to be issued in lieu of parts of the same, and those authorized to be furnished for sales to officers and enlisted men; also forage for beef-cattle. These are denominated subsistence stores. 2. The necessary means for handling, preserving, issuing, selling, and accounting for these supplies, as tools, scales, measures, utensils, stationery, safes, office-furniture, etc. These are denominated subsistence property.

4165. Q. What will be done with a view to the selection of the best markets, when subsistence supplies are required in considerable quantities for any section of the country? A. The chief commissary of subsistence of the department or district will submit to the Commissary-General, through the chief commissary of his division, a tabular statement showing the quantities required, the quality, the prices at which they were last obtained, and from what places, the prices at which they can be purchased in the vicinity of the several stations at which needed, together with such other information as will enable the Commissary-General to determine the places and methods of procuring them.

4166. Q. What restrictions are placed upon the transfer of subsistence supplies? A. Subsistence supplies shall not be transferred gratuitously to another staff department, nor obtained, issued, sold, or otherwise disposed of, except as prescribed by regulations.

4167. Q. Under what circumstances will a purchasing officer pay for supplies purchased? A. A disbursing officer of the Subsistence Department, when provided with sufficient funds, will pay promptly, for subsistence supplies purchased by him. When funds to pay for them, in the month in which purchased,

are not on hand, he will furnish the seller with a certified account of the purchase, in duplicate, stating thereon the cause of non-payment, and on what return he has taken up the articles.

4168. Q. When a claim for supplies delivered to a predecessor or other officer is presented to a commissary, what will he do? A. He will require the certified account, in duplicate, of the officer to whom the supplies were delivered, and the affidavit of the claimant that he has not been paid, directly or indirectly, for such supplies or any part thereof, and that he has not authorized any person to receive payment for him, and the commissary will transmit the claim to the Commissary-General of Subsistence for his instructions, unless previously authorized by the latter to pay it.

4169. Q. What is required when supplies are to be delivered by contractors or other sellers? A. They will be thoroughly inspected before acceptance by the commissary; or when he does not deem his own personal inspection, or that of one of his regular employés, to be sufficient, or when the quantity to be delivered is large, he may employ a competent expert to make such inspection, and pay therefor as an expense of the Subsistence Department. Certificates that such service has been rendered must accompany the accounts.

4170. Q. What officers are required to make monthly statements of the cost and quality of the ration, in all its parts, at their stations? A. Officers in charge of principal depots and purchasing stations.

#### REQUISITIONS FOR SUBSISTENCE SUPPLIES.

4171. Q. What are officers doing duty in the Subsistence Department who have not been authorized to purchase the subsistence supplies, including seed, required by them for issue or sale? A. They will make timely requisition therefor. If any of the supplies can be obtained in the vicinity of the place in which required, on terms advantageous to the Government, the requisitions will be accompanied by detailed statements showing the facts.

4172. Q. What officers are required to scrutinize all requisitions for supplies? A. Chief commissaries of subsistence of divisions and departments will carefully scrutinize all requisitions for subsistence supplies and will reduce or increase, the quantities to be supplied, as may be judicious in view of the quantities on hand and the probable demands.

4173. Q. What is required of post-commanders with regard to a probable excess of stores at their posts? A. Post-commanders will make monthly examinations of the stores on hand, and see that the wants of the officers and troops at their posts are met, in the requisitions made by the post-commissaries, and will cause the chief commissary to be notified if any article is accumulating in excess of probable demands.

## STORAGE AND CARE OF SUBSISTENCE STORES.

4174. Q. How are storage-rooms, etc., for subsistence supplies obtained? A. Good and sufficient store-houses, sheds, paulins, or other proper and adequate means of covering and protecting subsistence supplies, should be provided by the Quartermaster's Department. Care must be taken to keep store-rooms dry and well ventilated.

4175. Q. What precautions are required to be taken against fires? A. Officers doing duty in the Subsistence Department will make daily inspections of their store-houses, and see that water-barrels, buckets, and other means of extinguishing fires are ready for use, and that all proper precautions are taken to guard against loss thereby. Coal-oil, gunpowder, quick-lime, or other articles of like dangerous nature will not be kept in or about subsistence store-houses.

4176. Q. How is the issue of stores as regards length of time on hand regulated? A. Stores longest on hand, if in fit condition, will be first used for issues, transfers and sales.

4177. Q. What is required of officers of the Subsistence Department regarding examination of stores? A. At least once in each month officers responsible for subsistence stores will examine all packages on hand, and set apart those that require further inspection, early issue, repacking, rebrining, etc., and will take the necessary steps in regard to them. As soon as it is discovered that stores are not in fit condition for issue or sale, the officer will submit an inventory thereof to the commanding officer for the action of an inspector.

## INVENTORIES OF SUBSISTENCE STORES.

## LOSSES AND GAINS.

4178. Q. At what stated times are inventories of subsistence stores required to be made? A. Once in each calendar month (usually at its close) an accurate and detailed inventory of the stores actually on hand will be taken by the commissary, and all deficiencies and gains found to exist will be reported by him on his return of subsistence stores. Commanding officers will see that the monthly inventory is taken, and, when practicable, will cause it to be made under their personal supervision. They will also examine and approve the monthly statements of "gains" and "wastages" submitted by post-commissary.

4179. Q. When deficiency has arisen from ordinary, unavoidable, and actual waste what is done? A. In such cases, the commissary's certificate, examined and approved by the commanding officer of the post, will be accepted as a voucher therefor, as also for salt and vinegar used in rebrining or pickling stores,

or for waste of stores in overhauling or repacking. Ordinary wastage will not be allowed on fresh beef furnished directly by a contractor. Wastage will not be reported on the presumption that it exists, or will exist in the future ; but on the fact that it actually exists, as determined by examination.

4180. Q. How will deficiencies exceeding the percentage specified in the preceding paragraph ; or in articles for which a limit of ordinary wastage is not therein indicated ; or arising from losses by straying or death of beef-cattle, or from errors in their estimated net weight ; or from losses by theft, fire, or vermin ; or from deficient or unsuitable means of storage, etc.,—be accounted for. A. 1st, by boards of survey ; 2d, by affidavits ; 3d, by certificates of disinterested commissioned officers. Boards of survey should generally be assembled to report upon such deficiencies ; affidavits or certificates being used only in cases where the amount invoiced is very small, or when it is impracticable to assemble a board. Affidavits or certificates accounting for losses, extraordinary wastage, or for stores or property expended in preserving supplies, must set forth fully and clearly the facts of the case, and the quantities involved.

4181. Q. What will be done when subsistence supplies are to be transported from one point to another ? A. The invoicing commissary will make timely requisition, in writing, upon the proper quartermaster, stating as nearly as possible the kind and amount of supplies to be transported, when they will be ready for delivery, when they should reach their destination, and give any other information relating thereto which the quartermaster possesses. The commissary will also give the quartermaster transportation invoices in duplicate, of the packages and their contents as marked, and obtain from him receipts in duplicate. The commissary will forward similar invoices in duplicate, with letter of transmittal, to the officer for whom the supplies are intended.

4182. Q. What is done by the commissary who receives stores ? A. The receiving commissary will transmit to the invoicing officer receipts in duplicate, corresponding with the invoices, if the supplies received agree with them. If a deficiency is found, but does not exceed the small amount of wastage usually and unavoidably attending transportation, he will receipt for the supplies actually received, attaching to the invoices and receipts a certificate of such wastage.

4183. Q. When should a board of survey be asked for by an officer receiving subsistence stores, and what is required in the case ? A. If the receiving commissary finds any discrepancy between the invoices and the quantities, description, or condition of the supplies received, not attributable to ordinary wastage in transportation, he will at once apply to the commanding officer for a board of survey to ascertain the quantity and nature of the discrepancy, and fix the responsibility therefor. The receiving

commissary will transmit to the invoicing officer receipts in duplicate, for the supplies actually received, stating on the receipts the discrepancy ascertained, and how, and file a copy of the proceedings of the board with his return. The invoicing officer will file with his return the receipts accompanied by the quartermaster's transportation receipts. When the board finds the carrier responsible for the loss or damage, it will fix the amount in money to be charged to the carrier, which amount will be charged on the bill of lading, deducted from the freight-bill, and paid to the Subsistence Department.

4184. Q. When the receipts of the officers to whom the stores are invoiced are not received in time to accompany the return of the invoicing officer, what should be done? A. The quartermaster's transportation receipts should be forwarded instead, and the former should be transmitted when received.

4185. Q. When subsistence supplies are transferred by one commissary to another at the same station, without being turned over to a quartermaster for transportation, what is required? A. The invoicing and receiving commissaries will interchange duplicate invoices and receipts therefor. Should any of the supplies not be in good condition, a board of survey will be applied for at once to examine and report upon them. The condition as determined by the board will be noted upon the invoices and receipts, and a copy of the proceedings of the board will accompany each officer's returns.

#### BEEF-CATTLE.

4186. Q. How should beef-cattle be purchased, and what weight should they be? A. Beef-cattle should be purchased by gross or net weight, preferably however the latter, and all advertisements and contracts should state the average weight desired, and that none below a specified weight should be received. Generally, cattle weighing less than 1000 pounds should not be accepted, unless it is impracticable to procure them of that weight at economical rates, or smaller ones are preferred on account of the limited number of troops to be supplied, or for other sufficient reasons.

4187. Q. What character of cattle should be received, and how may the net weight be estimated? A. Bulls, cows, stags, and hornless cattle should not be received. When beef-cattle are accepted, whether under formal contracts or otherwise, they must be accurately weighed, if practicable, and will be accounted for in the return of subsistence stores by number and aggregate net weight. The net weight will be estimated at 55 per cent of the gross weight when the animal weighs 1300 or more pounds; 50 per cent when weighing less than 1300 and over 800 pounds; and 40 per cent when weighing 800 pounds or less. This mode of determining the net weight will govern only when the cattle are in condition to yield fresh beef of good and marketable quality; if

not in such condition they will be rejected, unless circumstances render acceptance or purchase indispensable, when a lower and specially determined percentage to determine their net weight will be adopted.

4188. Q. When the cattle of a herd cannot be weighed, how must their net weight be determined? A. The herd will be separated into three lots, according to apparent weight—heavy, medium, and light—or into a greater number of lots if the herd is large and the cattle are of great diversity in size; from each of these lots one average animal will be selected, killed, dressed, and trimmed, as prescribed in the ordinary beef contract, and accurately weighed; the dressed weight thus ascertained will be accepted as the average net weight of the lot from which selection was made.

4189. Q. How should fresh meat be supplied to troops? A. All supplies of fresh meats for troops should be contracted for and delivered from the block when it can be done economically, and cattle on the hoof purchased only for troops in campaigns or on the march.

4190. Q. What should be done with the hides of slaughtered cattle? A. Hides of slaughtered cattle should be taken up and accounted for on the returns of subsistence-stores, and sold as soon as practicable. Care must be exercised to preserve them, by either drying or salting, while they remain on hand.

4191. Q. What should contracts for beef-cattle stipulate? A. Contracts for beef-cattle should stipulate that the cattle shall be kept without food and water for twelve hours immediately preceding the time of weighing, and the manner for determining the net weight must be inserted therein. When open-market purchases are made, and time or special circumstances do not admit of reducing to writing the terms of purchase agreed on, the mode of determining the net weight must be stated to, and accepted by, the party supplying the cattle.

4192. Q. How may food for beef-cattle be obtained? A. Hay, corn, or other articles of food suitable for beef-cattle may be purchased for their subsistence when sufficient pasturage cannot be secured; the articles to be accounted for on the return of subsistence stores, and to be fed to the cattle in such quantity as may be necessary in order to supply the troops with beef of a good and marketable quality.

#### THE RATION.

4193. Q. What is meant by a ration? A. A ration is the established daily allowance of food for one person.

4194. Q. In what proportion is the ration of vegetables issued? A. One hundred per cent in fresh potatoes; or, eighty per cent in fresh potatoes and twenty per cent in fresh onions; or seventy

per cent in fresh potatoes and thirty per cent in canned tomatoes, or in such fresh vegetables as can be procured in the vicinity of the station, or which it may be practicable to furnish from a distance in wholesome condition—such as onions, cabbages, beets, turnips, carrots and squash.

4195. Q. What men of the army are entitled to more than one ration a day? A. Sergeants and corporals of the Ordinance Department are entitled, each, to one and one half rations per day.

4196. Q. What is done regarding the rations when men leave their company? A. When men leave their company, the rations drawn for them and left with it will be deducted from the next ration-return for the company; a like rule will govern in case of men leaving the hospital.

4197. Q. When and how are settlements of rations made at military stations? A. On each issuing day a settlement will be made, between each company and the hospital, of any difference of rations arising from men entering or leaving the hospital for whom rations had been previously drawn by the company or hospital. Such settlement will be submitted to the commanding officer, with the returns, and he will see that it is correct.

4198. Q. What certificate is furnished by the commissary when troops are detached from a post or command? A. The commanding officer of each company or smaller detachment will be furnished by the commissary with a certificate setting forth the date to which, and by whom, rations were last issued. This certificate will be presented to the commissary from whom rations may next be drawn, and will be transmitted by him, with his abstract of issues, to the Commissary-General. Similar certificates will be given to civilian employes entitled to rations.

4199. Q. When may back-rations be issued? A. Back-rations will not be issued, unless troops have not been sufficiently subsisted, and then only to such an extent as may be necessary for their health and comfort; no sales thereof will be allowed.

4200. Q. What substitutive issues may be made in the ration? A. Fresh mutton may be issued in lieu of, and at the same rate as, fresh beef, when the cost of the former does not exceed that of the latter. Fourteen ounces of dried fish, or eighteen ounces of pickled or fresh fish, may be issued in lieu of the meat components of the ration. Molasses, or syrup, may be issued in lieu of sugar, at the rate of two gallons to fifteen pounds of sugar.

#### THE TRAVEL-RATION.

4201. Q. What is meant by a travel-ration? A. When troops are travelling by cars, stages, transports, or otherwise than on the march, or when for short periods they may be separated from necessary cooking facilities, articles may be issued in lieu of all

components of the ordinary ration. They will constitute and be referred to as the "travel-ration."

4202. Q. When articles composing the "travel-ration" accumulate at posts in excess of anticipated demands, what will be done with them? A. They may, to prevent loss by deterioration, be issued to troops, upon the orders of commanding officers, according to the equivalents prescribed.

4203. Q. When and how can liquid coffee be issued to troops? A. To troops travelling by cars, stages, transports, or otherwise than on the march, and supplied with cooked or travel-rations, liquid coffee may be furnished in lieu of the coffee and sugar portion of the ration, provided the cost thereof does not exceed twenty-one cents per man per day. The accounts therefor will show that coffee and sugar were not drawn for the time for which the liquid coffee was furnished, and by what officers the other portion of the ration were issued.

4204. Q. By what means can liquid coffee be provided for troops, and how is it accounted for? A. For an organized command or a large detachment in charge of commissioned officers, funds for the purchase of liquid coffee will be transferred to, and be disbursed and accounted for by, a designated officer. At the end of the journey the unexpended balance will be transferred to the nearest commissary. For a small detachment the twenty-one cents per day authorized for the number of days for which travel-rations are furnished, may, on the order of the commanding officer directing the journey, be paid directly to the men, and their individual receipts will be taken and filed (with a copy of the order) with the account-current of the commissary.

4205. Q. What may be done when an excess of subsistence stores that have been provided for sales to officers and enlisted men exists at a post? A. Whenever subsistence stores (articles of food) furnished for sales to officers and enlisted men, have accumulated at a post in excess of the wants for that purpose, and are liable to damage if kept on hand solely for sales, the excess may be issued to troops on ration-returns, in lieu of some component parts of the ration of equal money value. In cases, however, of hams, white sugar, Java coffee, dried or pickled fish, or other articles which are equivalents of some of the components of the ration, the issue will be made at the rate per ration designated therefor.

4206. Q. In the event of a company or detachment failing to consume all the rations issued to it, what may be done with the excess? A. It may be sold, and the amount received therefor applied to the improvement of the soldiers' mess.

4207. Q. What issues of subsistence stores may be made to civilians? A. One ration a day may be issued to each civilian employed with the Army when the rate of pay does not exceed \$60 per month, and when the circumstances of his service make it



necessary, and the terms of his engagement provide for it. These issues will be on ration-returns similar to those used for troops, signed by the officer in charge of the employés, and ordered by the post-commander. One ration per day, in kind, may be issued to a contract physician when the stipulations of his contract provide for it. Such rations will be drawn on ration-returns, approved by post-commanders, and in the month when due.

4208. Q. How may destitute persons be provided with something to eat? A. Rations will not be issued to destitute persons, except when, to prevent starvation or extreme suffering, the overruling demands of humanity shall move the commanding-officer to assume the responsibility of ordering limited issues—he trusting to the circumstances, which will be fully stated in the order for the issue, that the Secretary of War will sustain his action.

4209. Q. Under what conditions may issues of rations be made to Indians? A. When issues are made to visiting Indians the orders therefor will be in writing, and will state the necessity for the issue, the number of Indians, the tribe or tribes to which they belong, the number of days for which the issues are made, and the articles and quantities to be issued. A copy of the order will accompany the abstract of such issues. The cost of the articles issued, including cost of transportation (when it can be ascertained), will be reported upon the abstract.

4210. Q. What articles are considered as “extra issue”? A. Adamantine candles, lantern-candles, salt, and vinegar.

#### SALES.

4211. Q. How will sales of damaged subsistence supplies be made? A. On due public notice, and in such market as the interests of the service may require. A copy of the inspection report, order, or authority for the sale; the notice of sale; the auctioneer's statement of sales will accompany the proper returns.

4212. Q. How will subsistence supplies in good condition, but not required for use, be disposed of? A. By orders from the Commissary-General of Subsistence. In urgent cases, such as a sudden abandonment of the post, their rapid deterioration, etc., these supplies may be sold as prescribed, or otherwise properly disposed of, on the written advice of an inspecting officer, approved by a commanding general.

4213. Q. What supplies may be sold to the Quartermaster's Department? A. The Subsistence Department will sell to the Quartermaster's Department, at cost price, the flour which the latter is required to provide, for use in target practice; also the matches which the latter is directed to issue to troops.

4214. Q. What is done with the proceeds of all sales of subsistence supplies? A. The proceeds of all sales of subsistence supplies are exempt from being covered into the treasury, but

will be taken up on the officer's account-current as being immediately available for the purchase of supplies.

#### SALES TO OFFICERS AND ENLISTED MEN.

4215. Q. What is the Subsistence Department authorized to provide for sales to officers and enlisted men, and who furnishes the list of articles? A. Articles composing the ration, and such other articles as may be designated by the Inspectors-General of the Army. The Commissary-General of Subsistence will, from time to time, furnish the proper officers with lists of such articles, and instructions for procuring, selling, and accounting for the same.

4216. Q. Under what conditions may subsistence supplies be sold to officers and enlisted men? A. Articles purchased by the Subsistence Department, by actual net weight, will be sold to officers and enlisted men at actual net weight at the time of sale; but articles put up in wrappers or canvas covers—such as hams, or breakfast bacon, which are usually bought by weight, including wrappers and covers—and articles purchased in sealed cans, cartoons, or packets, will be sold as purchased. Subsistence supplies sold to officers and enlisted men and employés are for the use of purchasers, and must not be sold or bartered by them.

4217. Q. What rule obtains as to furnishing subsistence supplies to the families of absent officers? A. When an officer of the Army is absent from his family, any member thereof authorized by him may, in his name, make purchases, as specified in the preceding paragraph, upon his written request to the commissary at the place where the purchases are to be made.

4218. Q. What sales of subsistence stores are to be regarded as cash sales? A. Whenever subsistence stores, sold to officers, are paid for within the calendar month in which they are sold, the sales shall be regarded as cash sales; if not paid for within that month, they will be regarded and reported as credit sales, and the amounts due will be collected through the Pay Department.

4219. Q. Under what conditions may stores be sold on credit? A. Subsistence stores may be sold on credit to an officer who has not been regularly paid, or who is in the field where it is impracticable to procure funds, upon his certificate that the stores are required for the use of himself and his family, and his written receipt for the articles. Subsistence stores may be sold on credit to enlisted men who have not been regularly paid, or who are in the field where it is impracticable to procure funds, on written permits, signed by their respective company commanders and approved by their commanding officers; but such permit shall not be given to any enlisted man in excess of the amount of unincumbered pay due him, nor in any month in excess of the amount of his monthly pay.

4220. Q. How are the abstracts of sales on credit to be made? A. "Abstracts of sales to officers on credit" will be made in duplicate, one to accompany the return of subsistence stores and the other to be filed with the one retained. A "Statement of dues to the Subsistence Department from officers for subsistence stores sold to them on credit" will be made in duplicate, one to be attached to the "Abstract of sales to officers on credit," which accompanies the return of stores, and the other to be attached to the retained abstract. "Abstracts of sales to enlisted men on credit" will be made in duplicate, one to accompany the return of subsistence stores and the other to be filed with the retained return. A "Statement of dues to the Subsistence Department from enlisted men, of subsistence stores sold to them on credit," will be made in triplicate, at the end of each month (or earlier if the officer ceases to perform subsistence duty, or the company leaves the post or station), for each company to the enlisted men of which sales have been so made. One of the triplicates will be filed with the "Abstract of statements of dues to the Subsistence Department from enlisted men for stores sold to them on credit;" one will be filed with the retained abstract, and the third delivered by the commissary to the company commander for file with the company records.

4221. Q. How are prices of stores to be sold to officers and enlisted men prepared? A. On the first day of each calendar month officers doing duty in the Subsistence Department will prepare a list, showing the cost prices at which stores will be sold to officers and men during that month. Such cost price for each article, will be the invoice price of the last lot of that article received by the officer prior to the first day of said month.

4222. Q. Under what circumstances may subsistence stores be sold to civil employes of the Government? A. Civilians employed with the Army at remote posts, where food cannot otherwise be procured, may purchase stores from the Subsistence Department in limited quantities, for their own personal use only, paying cash therefor on delivery at invoice or contract price, with 10 per cent added.

4223. Q. To whom will commutation of rations be paid? A. No persons, except enlisted men, will be paid commutation of rations by the Subsistence Department.

4224. Q. To what enlisted men will commutation of rations *not* be allowed? A. Commutation, in lieu of rations, will not be allowed to recruiting parties while at their stations, nor to soldiers serving where subsistence in kind is provided by the Government, unless it is specially authorized by the Secretary of War. Commutation of rations will not be allowed to men travelling under orders when they can be subsisted by cooked rations.

4225. Q. What kind of rations will as a rule be furnished to enlisted men travelling? A. Rations in kind will be furnished

to men travelling under orders in all cases where they can carry and cook them; when they cannot cook them *en route*, cooked rations, or the prescribed travel-ration, will be furnished when practicable.

4226. Q. What are the different rates of commutation for rations, and to whom are these rates paid? A. Sergeants of the post non-commissioned staff, on duty at forts and stations, where there are no other troops, to be commuted at the rate of forty cents per day; thirty cents per day may be paid to soldiers stationed where the Government does not otherwise provide for their subsistence, on satisfactory evidence that they have not received rations, or an equivalent therefor, during the period for which commutation is claimed; there may be paid to a soldier detached, travelling under orders, at the rate of one dollar and fifty cents per day, or less, as the Secretary of War may direct, when it is impracticable for him to be subsisted as required. The amount will be paid by the commissary when due, or in advance, upon the order of the commanding officer, for the necessary number of days' travel over the shortest travelled route. The voucher will show the nature and extent of the duty and kind of transportation, and will be accompanied by the order directing the journey to be made, or a duly authenticated copy thereof, which order will state that the journey is necessary for the public service, that it is impracticable for the soldier to carry rations of any kind, and, if payment of commutation is ordered in advance, the number of days for which it is to be made. When it is proper that the original order shall be retained by the soldier, the amount paid him will be noted thereon, with the date and place of payment duly signed by the commissary. There must be added to the voucher the certificate of a commissioned officer (in all practicable cases that of the officer ordering the journey) that the number of days charged for is (or was) the actual time required to make the journey, and that he is satisfied that it is (or was) impracticable for the soldier to be subsisted as required otherwise.

4227. Q. Under what conditions will the commutation of one dollar and fifty cents be allowed? A. As a rule, only in case of a soldier travelling alone under orders. It will not be paid to detachments consisting of more than two men, nor in any case where the travel can be accomplished in less than twenty-four hours, except in case of an enlisted man ordered from the place or station where his rations have been regularly commuted, or where rations in kind cannot be furnished.

4228. Q. What commutation for rations will be paid a soldier on furlough, and what is required before payment? A. Commutation of rations, at twenty-five cents per day, will be paid to a soldier on furlough by competent authority, provided he has reported for duty at his proper station, as required by the furlough, on or before the date of its expiration. The furlough

must show the date to which the soldier has been subsisted, and must be presented with the claim for commutation, with the certificate of a commissioned officer that the soldier has returned to duty at its expiration. Payment will not be made until the expiration of the furlough and return therefrom. The officer making the payment will indorse the fact upon the furlough, and certify on the voucher for the payment that he has made such indorsement.

4229. Q. How are the extra-duty men in the Subsistence Department paid? A. The *per diem* allowed by law to enlisted men detailed on extra duty in the Subsistence Department will be paid by the commissary at the end of each calendar month, or when relieved.

#### BOOKS AND RETURNS.

4230. Q. What books are required to be kept in the Subsistence Department at posts, and for what purpose? A. At each military post a "Letter-book," a "Commissary-book," and a "Record-book" will be kept by the commissary, and will not be removed therefrom. In the commissary-book will be entered all the returns of subsistence stores. In the record-book will be copied all letters, orders, instructions, and other authoritative papers, not printed, relating to the administration of the duties of the Subsistence Department, which are received by a commissary and which should be brought to the attention of his successor. Every disbursing officer of the Subsistence Department will keep, in a "Cash-book," a detailed record of all moneys, item by item, received or disbursed by him. The book will be balanced at the end of each calendar month (or more frequently if necessary), to exhibit the precise condition of his money responsibility. A detailed account of all sales to officers and enlisted men shall be made, at the time of sale, in a book kept for that purpose, and, at the close of each day, such sales shall be made up and recorded; the cash sales in one book, those on credit in another.

4231. Q. What returns and accounts in the Subsistence Department will be prepared and when returned? A. An Account-current by all officers responsible for subsistence funds, and rendered within ten days after the close of each month; weekly and monthly statement of funds; return of subsistence stores; return of subsistence property, rendered quarterly.





## PART XIII.

### *TROOPS IN CAMPAIGN.*

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TEXT-BOOK:—*U. S. Army Regulations.*

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FOR ALL OFFICERS OF THE LINE—Nos. 4232-4427.





## PART XIII.

### TROOPS IN CAMPAIGN.

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#### ORGANIZATION OF AN ARMY IN THE FIELD.

4232. Q. When it becomes necessary to concentrate the land forces of the United States for field operations, how will they be organized? A. Into brigades and divisions, and if necessary into army corps and separate armies.

4233. Q. Of what is a Brigade composed, how commanded, and what kind of unit is it? A. A brigade will ordinarily be composed of troops of one arm of the service. It is a tactical unit, requiring an administrative staff only when acting separately. It is composed of two or more regiments, depending on their strength, and is commanded by a brigadier-general, or by the senior colonel.

4234. Q. Of what is a Division composed, how commanded, and what kind of unit is it? A. A division is ordinarily composed of two or more brigades of infantry or cavalry; but under special circumstances, may embrace troops of all arms of the service. It is the command of a major-general. The division is the basis of organization of an army, and is both a tactical and administrative unit. The administrative control in matters relating to courts-martial, the supply service, and money and property accountability, vested in the commanders of territorial departments, devolve, in the field, upon division commanders, under the orders of the commanding general of the army or department.

4235. Q. Of what does an Army Corps consist, how organized, and under whose control is it? A. An army corps will ordinarily consist of two or more divisions of infantry or cavalry and a brigade of artillery; but, when designed to act independently, should contain such proportions of all arms of the service as to be self-sustaining. An army corps detached from the main army, but operating in the same theatre of operations, remains under control of the general commanding the main army. Army corps are only organized by special authority from the President.

4236. Q. How are brigades, divisions, army corps and armies designated? A. Brigades in divisions, and divisions in army

corps, receive numerical designations upon their organization; as, "first brigade, second division;" "third division, first army corps," etc. Army corps are numbered in the order of their organization. Separate armies receive territorial designations.

4237. Q. How are temporary organizations, such as wings, centres, and reserves formed? A. Temporary organizations consisting of more than one division, as wings, centre, and reserve, may be formed under temporary commanders, but such temporary commanders will not interfere with the organization or administration of the divisions thus united, and will only direct their movements in marches and on the field of battle.

4238. Q. How should troops arriving at rendezvous or places of organization be assigned? A. They will be assigned to brigades and divisions by the commanding general.

#### COMMANDS.

4239. Q. How are the commanders of army corps and separate armies assigned? A. By the President.

4240. Q. When two or more armies are combined for military operations, what is the title of the commander? A. General-in-chief.

4241. Q. In case of death or disability of the commanding general of an army or corps, who exercises command? A. The next in rank shall exercise the command until the will of the President be known.

4242. Q. By whom are the commanders of brigades and divisions assigned? A. If the commanders of brigades and divisions be not designated by the War Department, they will be assigned by the commanding general of the army in the field.

4243. Q. How are the functions of a commanding general facilitated? A. By the existence of the organized fractions of the army, since he communicates only with the generals who command those fractions. He is also assisted in his duties by a chief of staff, by one or more officers of the Adjutant-General's Department, an officer of the Inspector-General's and Judge-Advocate General's Departments, and by the chiefs of the several administrative services.

4244. Q. What are the functions of a chief of staff? A. To transmit the orders of the commanding general and to attend to the execution of orders directing movements and other necessary labors, as the construction of works and lines of defense; the opening and repair of roads and communications; the construction of bridges and the establishment of camps and posts; to see that directed reconnaissances are properly made, and that all branches of the service are efficiently conducted. He will be assisted in the performance of these duties by as many officers of the Adjutant-General's Department as may be necessary.

4245. Q. What staff officers shall be attached to each army and to each army corps for the direction of administrative purposes, and what is their special duty? A. Superior officers of the Ordnance, Quartermaster's, Subsistence, Pay, Medical, and Signal Departments, an officer of the Judge-Advocate-General's Department, and a chief commissary of musters, with such inferior officers, assistants, and employes as may be required. They report to and receive the orders of the general under whom they are employed, either directly or through the chief of staff, and centralize all the details of administration of their respective services.

4246. Q. By whom are the means and methods of obtaining supplies looked after? A. By the chiefs of the several administrative services, whose duties are performed in conformity with the regulations prescribed for those services.

4247. Q. What are the duties of a provost-marshal-general, and what command will he have? A. He will have under his command the force necessary to preserve a proper police throughout the lines of the army; to protect the inhabitants of the country from pillage and violence; to keep watch on all non-military persons and camp-followers; to follow the column on the march and bring up stragglers, and to arrest skulkers and fugitives from the battlefield. He will take charge of all prisoners of war and deserters from the enemy, and, under the direction of the commanding general, will superintend the secret service. He will receive his orders through the chief of staff, and make such written reports as may be required.

4248. Q. Who is responsible for the establishing, arranging, and commanding the camp of the army headquarters, and what are his especial duties? A. There will be attached to the general headquarters an officer vested with authority to establish, arrange, and command the camp, place the posts and guards, and control the administrative services of the headquarters. He will also direct the movements of its train, and, in conjunction with the provost-marshal-general, or by means of the necessary guard allowed him, preserve order at headquarters.

4249. Q. What is the title given officers detailed at the headquarters of an army or army corps or of divisions or separate brigades to muster in troops, and what are their duties? A. A commissary of musters, and an assistant commissary of musters, whose duty it shall be to make all musters into and out of the military service, to give any information upon the subject of musters that may be needed by officers serving in the command to which they are attached, and to exercise such supervision over the preparation of the regular muster and pay-rolls as will secure their uniformity, accuracy, and completeness. They will conduct the business of their office and will render reports and returns thereof in accordance with such instructions as may be pre-

scribed from time to time in orders from the Adjutant-General's Office.

4250. Q. Of what shall the staff of an army corps consist? A. One assistant adjutant-general, one quartermaster, one commissary of subsistence, and one inspector-general, who shall be assigned from the army or volunteer force by the Secretary of War; also, the authorized aides-de-camp of the commanding general. The senior officer of artillery in each army corps shall, in addition to his other duties, act as chief of artillery and ordnance at the headquarters of the corps.

4251. Q. What staff officers are attached to the headquarters of a division? A. The number and rank depend, to a certain extent, on creations made by Congress. There should be an assistant adjutant-general, an inspector, a judge-advocate, a medical director, a commissary of musters, a provost-marshal, and chief of the several administrative services, with the number of inferior officers and employés required by each.

4252. Q. How are brigades provided with staff officers? A. Brigades will be provided with such administrative staffs as are necessary. Separate brigades—that is, brigades not assigned to divisions—will be provided with such administrative staffs as are deemed necessary by the authority creating them. Commanders of such brigades have the powers of division commanders in all that regards discipline and administration.

4253. Q. What is required of all staff officers in time of battle? A. All staff officers who are not otherwise employed at the time act as aids to their commanding general on the field of battle.

#### ARTILLERY AND ENGINEERS.

4254. Q. How will the artillery and engineers be organized in each army? A. According to the nature of the service and the theatre of operations. They will, as a rule, constitute special commands, under their own officers; but, when assigned to army corps and divisions, will be on the footing of other troops attached for service.

4255. Q. In what manner will the batteries be distributed in an army in the field? A. Under ordinary circumstances, from two thirds to three fourths of the field-batteries will be distributed to the army corps, or to divisions, and in proportion to the strength of those commands. The remaining batteries will be organized into brigades, and will constitute the reserve artillery of the army.

4256. Q. What will the ammunition columns, with artillery material, the tools, etc., required for general repairs, constitute? A. The grand park of the artillery; those required for each army corps will constitute the artillery park of that corps.

4257. Q. If it is probable that a siege-train will be required,

what is done with it? A. It should be organized, instructed, and held in depot until needed. When brought forward it will report directly to the commander of the artillery for instructions.

4258. Q. In what manner is the reserve artillery of the army and the artillery brigade of a corps disposed of? A. The reserve artillery of the army and the artillery brigade of each army corps should, as far as practicable, be kept together; but on the march, or in camp, or when near the enemy, additional batteries may be attached temporarily to divisions, due provision being made for their proper supply.

4259. Q. If an army is not organized into army corps, how is the artillery commanded? A. A superior officer of artillery will be assigned to command the artillery of each division. He shall also act as chief of artillery upon the staff of the division commander.

4260. Q. How is the organization, distribution, and service of the engineers arranged? A. On the same general principles as the artillery. The engineer-park, with the reserve pontoon-trains, and two or more regiments of engineer troops, will be under the command of an engineer officer, who reports to and receives the orders of the officer commanding the engineers of the army. When circumstances make it expedient, either on the march or near the enemy, engineer troops and bridge equipage may be distributed to army corps or to divisions.

4261. Q. If the army is not organized into army corps, how will the distribution of the engineers be made? A. A superior officer of engineers will be assigned to the command of the engineers of each division, which will consist of one or more battalions of engineer troops and the necessary bridge equipage, material, and stores. He shall also act as chief engineer on the staff of the division commander.

4262. From whom will the commander of artillery and engineers receive orders, and what are they prohibited from doing? A. Commanders of artillery and engineers receive directly, or through the chief of staff, the orders of the general officer under whom they serve. They are prohibited from communicating to others than the commanding general, or the general officer under whose immediate orders they serve, any information as to the state of material and stores under their charge, or as to plans of position, or works executed or to be executed under their direction.

4263. Q. What is required of an officer of the artillery, engineers, or of the staff, charged with the construction of works, or with the direction of other military labors to be performed by troops? A. He will make a requisition for the necessary detail, specifying the number of men required, the time and place at which they will assemble, and the time for which they will be required, and the name and rank of the officer to whom they will

report, and from whom they are to receive instructions. This officer will direct what is to be done, how it is to be done, and will see that it is done correctly. It will be the duty of all officers commanding working-parties, whatever may be their rank, to see that such instructions are duly followed.

4264. Q. What report will be made by officers of engineers attached to headquarters at the close of a campaign? A. They will report their operations in all that concerns their specialty to the headquarters of their corps. Those having commands will also submit copies of the reports of battles, etc., rendered to the general under whom they serve, together with such special reports as may be necessary or useful for the records of the Engineer Bureau. These reports will embrace plans of military works erected, and in case of siege operations the journals of attack and defence.

#### THE ADMINISTRATIVE SERVICES.

4265. Q. What reports will the chiefs of administrative services render at the close of a campaign? A. They will render reports to their respective bureaus, with such information and suggestions for the improvement of these services as they may be able to furnish.

#### GENERAL POLICE.

4266. Q. What are civilians employed with the army required to carry with them? A. Certificates of their employment from the headquarters employing them.

4267. Q. How are private servants with an army to be clothed and recognized? A. Private servants will not be allowed to wear the uniform of any corps of the army; and each will be required to carry with him a certificate from the officer who employs him, verified, for regimental officers, by the signature of the colonel; or other officers under the rank of colonel, by the chief of their corps or department.

4268. Q. What will be done with the arms and accoutrements of deserters from the enemy? A. They will be turned over to the Ordnance Department, and their horses and other public property in their possession to the Quartermaster's Department. The compensation to be accorded to deserters for such objects will be according to appraisement made under the direction of that department.

4269. Q. How may deserters from the enemy be enlisted? A. The enlistment of deserters from the enemy, without express permission from general headquarters, is prohibited.

#### TENTS, BAGGAGE, AND BAGGAGE-TRAINS.

4270. Q. By what means are tents supplied, and how will their use be regulated? A. Tents are supplied by the Quartermaster's

Department on requisitions approved by commanding generals. The number for each regiment, for general and staff officers, for hospitals, etc., will depend to a great extent upon the season, climate, and nature of service. They may be dispensed with, if, in the opinion of the general commanding in chief, it becomes absolutely necessary. Hospital tents are for the sick and wounded, and must not be diverted from their proper use.

4271. Q. How is the amount of baggage to be carried by officers regulated? A. The commanding general of an army will regulate and limit the amount of baggage to be carried by each officer, in accordance with the exigencies of the service.

4272. Q. Under whose charge will the baggage-train be, and what are the rules governing such trains? A. The baggage-trains belonging to headquarters, and to the headquarters of army corps and divisions, will be in charge of officers of the Quartermaster's Department attached to those headquarters. The train of each regiment will be under the control of the regimental quartermaster. When the several trains of a division, corps, or command are united, the senior officer of the Quartermaster's Department present shall have charge of the whole. Each quartermaster, with his assistants, must be with the train. He will require it to take and keep its appropriate place in the column, and will see that his wagons do not check the march of the troops or movements of trains in the rear. None but authorized wagons are allowed to move with the train. Those of the several headquarters, the regimental wagons, and those of traders will be conspicuously marked.

4273. Q. How will baggage-trains not under convoy be guarded? A. In every case where practicable, generals who have headquarters guards will detach sentinels therefrom to protect their baggage during the night, rather than cause a distinct detail to be made for the purpose. The trains of brigade commanders will join with, and be protected in march by, the men attached to the trains of the regiments in their respective brigades. The regimental trains will be guarded in march, as far as practicable, by convalescents, or men non-effective in the ranks, and in the cavalry by dismounted men.

4274. Q. When are trains said to be convoys? A. When trains are to be escorted with a view to defense, they will then become convoys, and, in such cases, the officer in charge of the same will be under the orders of the commander of the escort.

4275. Q. In what order will trains move? A. In the order corresponding with the position in the column of march of the corps to which they belong. The general supply-trains of the army will have a place especially assigned them.

4276. Q. What is required of general officers regarding unauthorized transportation, dismounting of troopers or use of public animals for private vehicles? A. General officers will not permit

officers of their commands, nor any persons whatsoever attached thereto, to have more than the authorized amount of transportation; and, to properly enforce this regulation, they will make or cause to be made, frequent inspections of the trains. They will not permit a trooper to be dismounted that an officer may use his horse, nor to be employed to lead a private horse, nor allow a soldier to drive a private vehicle. They will not permit the wagons of the artillery, or trains, to carry anything but the authorized articles, nor a public horse, on any occasion, to be harnessed to a private carriage.

#### HEADQUARTERS, DEPOTS, ETC.

4277. Q. Where should a general officer encamp? A. Near the centre of his command on the main line of communication. If his troops bivouac in the presence of the enemy, he should bivouac with them.

4278. Q. Where are the general depots of an army established? A. At points that are not threatened by military operations. Minor depots are established at convenient points for the temporary supply of an army or fractions thereof, where also may be located general hospitals and convalescent camps, to which the disabled are sent for treatment, and from which those fit for service may be forwarded. They may also be made points for the receipt and distribution of recruits and detachments.

#### ISSUE OF RATIONS.

4279. Q. How and for what time will rations be issued? A. The time and period for the issue of rations will depend on circumstances, and will be regulated in orders. When a command is not moving, they will be made for the period of three or four days. Issues to the companies of a regiment will be superintended by an officer detailed for that purpose.

#### INTRENCHED POSTS.

4280. Q. What are intrenched posts, and by whose order established? A. An intrenchment that requires artillery is considered a post, and a guard or garrison and commander are assigned to it. Posts connected with the operations of an army are established only by the order of the general commanding the army.

4281. Q. From whom does the commander of an intrenched post receive his orders, and what are the duties of that commander? A. The general who establishes an intrenched post, gives to its commander detailed instructions in regard to its defense, and the circumstances under which the defense should



cease. The commander reconnoitres his post ; distributes the troops ; posts the officers and non-commissioned officers ; forms a reserve, and gives orders for all the contingencies which he can foresee. Having defended his post to the last extremity, or until the purpose of the defense is served, he may then disable his guns and rejoin the army, under cover of night, or by cutting his way through the enemy.

## CAMPS.

4282. Q. Where and how should troops encamp? A. In the selection of camp-grounds great care will be exercised as to wood, water, healthy location, and the roads by which the supplies are to reach them. Troops will encamp in strict military order, ready at any moment to form in order of battle or march. The front of the camp should be on or near the line of battle, and should be equal to the front of the command when deployed in strong battle order. Camps near the enemy should be covered by light intrenchments.

## MILITARY EXERCISES.

4283. Q. When are troops in campaign required to have military exercise? A. When troops remain in camps or cantonments many days, regimental commanders will require them to be exercised in the school of the battalion. They will not be exercised at firing without the authority of the general commanding in chief. The practice of the field-music must never begin with the "general," the "march," "boots and saddles," or "to arms." The hour for practice is always announced.

## ARTICLE V.

## RECONNAISSANCES.

4284. Q. By whom and under whose orders are special reconnaissances made? A. Under the instructions of the general commanding, and by such officers, and with such force, as he may direct.

4285. Q. What are offensive or forced reconnaissances made for? A. They are to ascertain with certainty, points in the enemy's position, or his strength. They are sometimes preludes to actions, and sometimes only demonstrations. They drive in his outposts, and may engage special corps of his line. They will only be made by order of the general commanding in chief, or by the commander of an isolated corps.

## MILITARY OCCUPATION, CONTRIBUTIONS, AND REQUISITIONS.

4286. Q. What is the extent of military jurisdiction in the enemy's country, and how is it exercised? A. Under the laws

and usages of war, it extends to property and persons within the territory occupied or controlled by the Army. It is exercised by commanding generals, under the instructions of the War Department. It is based upon military necessity, and applies those measures that are indispensable for securing the objects and ends of the war, and for the protection of life and property of non-combatants.

4287. Q. What do the laws of war admit of? A. The laws of war admit of all direct destruction of armed enemies, and other persons whose destruction is incidentally unavoidable in armed contests. They permit the capture of every armed enemy, and of every enemy of importance to the hostile government or of danger to the captor. They allow the destruction of property; the obstruction of the ways and channels of traffic, travel, or communication; the withholding of subsistence or means of life from the enemy, and the appropriation of whatever an enemy's country affords necessary for the subsistence and safety of the army.

4288. Q. In what manner may military authority affect the laws of a hostile and occupied country? A. Military authority may suspend the execution of the laws of the hostile and occupied country. It may suspend or change the relations which arise from the services due, according to the existing laws of the invaded country, from one citizen or subject of the same to another. It may collect and appropriate public revenue and taxes, and confiscate public property. Unarmed citizens are to be spared and protected in their persons and property, in so far as the exigencies of war will admit, and they will be as little disturbed in their private relations as possible.

4289. Q. When may contributions be levied on an enemy's country? A. When the needs of the army absolutely require it, and in other cases, under special instructions from the War Department, the general commanding the army may levy contributions, in money or kind, on the enemy's country occupied by the troops. No other officer can levy contributions, except under special authority from the War Department.

4290. Q. What is to be done with property taken from the enemy's country? A. All property, public or private, lawfully taken from the enemy, or from the inhabitants of an enemy's country, by the forces of the United States, instantly becomes the public property of the United States, and must be accounted for as such. Property captured or taken by way of requisition belongs to the United States, and cannot, under any circumstances, be appropriated to individual benefit.

4291. Q. How is property taken from enemies to be accounted for? A. Officers will be held strictly responsible that all property taken from alleged enemies by them, or with their authority, is inventoried and duly accounted for. If the property taken can be claimed as private, receipts must be given to the claimants or

their agents, and it must be accounted for in the same manner as public property. When a foraging party is sent out for provisions or other stores, the commanding officer will be held accountable for the conduct of his command, and that a true report is made of all property taken.

4292. Q. How may officers and soldiers render themselves subject to a death penalty in taking property? A. No officer or soldier shall, without authority, leave his colors or ranks to take private property, or to enter a private house for that purpose. All such acts are punishable with death, and any officer who shall permit them will be equally guilty with the actual pillager.

4293. Q. In the purchase of horses in an enemy's country what is required? A. It is forbidden to purchase horses without ascertaining the right of the party to sell. Stolen horses shall be restored. Estrays in the enemy's country, when the owners are not discovered, will be taken for the Army.

4294. Can an officer or soldier make use of his official position in an enemy's country for commercial transactions? A. No; neither officers nor soldiers are allowed to make use of their positions or power in the enemy's country for private gain, even for commercial transactions otherwise legitimate. Offences to the contrary, committed by commissioned officers, will be punished with cashiering, or such other punishments as the nature of the offence may require; if by soldiers, they shall be punished according to the nature of the offence.

4295. What are the penalties against wanton violence in the enemy's country? A. All wanton violence committed against persons in the invaded country may be punished with the death of the offender, or such other punishment may be inflicted as may be deemed adequate to the gravity of the offence. Any officer or enlisted man committing such violence, and disobeying a superior ordering him to abstain therefrom, may be lawfully killed on the spot by such superior.

#### SAFEGUARDS.

4296. What are safeguards? A. Safeguards are written protections, granted to persons or property, by the commanding general of an army in the field. They are usually given to protect hospitals, museums, establishments of religion, charity, or education, mills, post-offices, and other institutions of public benefit; also to individuals whom it may be to the interest of the Army to respect.

4297. What is the form of a safeguard? A.

#### FORM OF A SAFEGUARD.

By order of —.

A safeguard is hereby granted to (A. B. —; stating precisely the place, nature, and description of the person, property, or

buildings). All officers and soldiers belonging to the Army of the United States are therefore commanded to respect this safeguard, and to afford, if necessary, protection to (person, family, or property of——, as the case may be).

Given at Headquarters of the——day of——.

A. B. ——

*Major-General Commanding in Chief.*

C. D. ——

*Assistant Adjutant-General.*

The Act of February 13, 1862, will be printed or written across the face of the safeguard. Safeguards will be numbered and registered.

4298. How may persons know that property is under the protection of a safeguard? A. A safeguard will be conspicuously posted upon the property which it is intended to protect. If the commanding general deem it necessary, a suitable escort or guard may be furnished to enforce respect to its terms. Men thus furnished from a corps and left in rear will be replaced by men of the corps following; or they may be withdrawn when the country is evacuated. Should they have orders to await the arrival of the enemy's troops, they will apply to the commander of the same for safe conduct to the outposts.

#### PRISONERS OF WAR.

4299. Q. What constitutes a prisoner of war, and what classes of persons are subject to be held as such? A. A prisoner of war is a person who, by capture or surrender, falls into the hands of the enemy. The following persons, or classes of persons, are subject to capture and detention as prisoners of war: All soldiers of the enemy of every grade, to whatever arm of the service they may belong; all individuals who take part in a rising *en masse* in hostile territory; all persons attached to an army who contribute to its efficiency, and promote directly the object of the war; the sovereign, or chief executive of a hostile state; members of his family; the chief officers of the government; its diplomatic agents, and in general any civil officer whose services are of importance to the enemy, or whose detention would be prejudicial to his military operations; citizens who are authorized to accompany an army for any purpose, as sutlers, traders, or correspondents of newspapers.

4300. Q. What persons are not entitled to the right of prisoners of war. A. Spies; armed prowlers, by whatever name they may be called, who lurk in the vicinity of the army and commit acts of hostility without the authorization of their government, or who carry on their operations in violation of the laws of war; troops of the enemy who are known to give no quarter; deserters from

the military service of the United States who have voluntarily entered the service of the enemy.

4301. Q. What consideration should be shown to medical officers and hospital people generally when captured? A. The principle being recognized that the medical officers, stewards, nurses, attendants, and chaplains should not be held as prisoners of war, they will be immediately and unconditionally discharged, unless the enemy has previously failed to take like action in like cases.

4302. Q. What will be done with prisoners of war when taken, and how will they be accounted for? A. Prisoners of war will be disarmed and sent to the rear, and reported as soon as practicable to the general headquarters. Commanders of department or armies in the field having prisoners of war in their possession will require full descriptive rolls to be prepared, showing the rank, regiment, and company or corps of each prisoner and the time and place of his capture. These rolls will be forwarded without delay to the adjutant-general, with a letter of transmittal, showing what disposition has been made of the prisoners, and giving any other information that may be useful. They should be signed by the officer taking charge of the prisoners at the time they are captured.

4303. Q. How may prisoners of war be sent to depots, and what must be furnished in their cases when so sent? A. Generals commanding departments or armies in the field may, at their discretion, send prisoners of war to the general depots, furnishing them with proper descriptive rolls, showing in each case the rank, regiment, and company or corps, and place and date of capture; after which their charge of them will cease.

4304. Q. What is the penalty for killing or wounding an enemy already disabled? A. Whoever intentionally kills or wounds an enemy already disabled, or who orders or encourages others to do so, shall suffer death.

4305. Q. How are prisoners of war to be treated? A. Every prisoner of war will be treated with the consideration due his rank. He is required to obey the necessary orders given him, and upon being duly interrogated, is required to disclose his name, rank, and designation in the military service. Wounded prisoners are to be treated with the same care as the wounded of the army. Every prisoner of war is entitled to one ration per day, regardless of rank; other allowances to them will depend on conventions with the enemy. Prisoners' horses, arms, and other public property will be taken up and accounted for as captured property, in accordance with the requirements of paragraph 38 of Army Regulations.

4306. Q. How will money and valuables on a prisoner of war be considered? A. Money and other valuables on the person of a prisoner, such as watches and jewelry, as well as extra clothing,

will be regarded as private property. The appropriation of such property is considered dishonorable and is prohibited.

4307. Q. What is the regulation concerning ransoms for prisoners of war? A. A prisoner of war, being a public enemy, is the prisoner of the Government and not of the captor. No ransom can be paid by a prisoner of war to his individual captor or to any officer in command. The Government alone releases captives, according to rules prescribed by itself.

4308. Q. How should the liberty of a prisoner of war be restrained? A. Prisoners of war are subject to such confinement or restraint as may be deemed necessary, but they are to be subjected to no other intentional suffering or indignity. The confinement of a prisoner may be varied during his captivity, according to the demands of safety.

4309. Q. What is done with prisoners of war who attempt to escape, who are recaptured after escaping, or who form plots to escape? A. A prisoner of war, while attempting to escape, may be shot; but if recaptured neither death nor any other punishment shall be inflicted upon him simply for his attempt to escape, which the laws of war do not consider a crime. More rigorous methods of confinement may be resorted to after an unsuccessful attempt. If, however, a conspiracy be discovered, the purpose of which is a united or general escape by force, the conspirators may be severely punished, even with death. Capital punishment may also be inflicted upon prisoners of war who have plotted rebellion against the capturing authority, whether in combination with fellow-prisoners or other persons.

4310. Q. In what way does a prisoner of war remain answerable for offences committed by him? A. A prisoner of war remains answerable for offences against the captor's army or people committed previous to his capture, and for which he has not been punished by his own government. All prisoners of war are liable to the infliction of retaliatory measures, if such are found necessary.

4311. Q. How will sick and wounded prisoners of war be cared for? A. As far as practicable, they will be collected in hospitals designated by the surgeon-general for their exclusive use. A suitable guard will be detailed by the commander of the department in which such hospitals are situated. The commander of the guard will make the returns and reports required of depot commanders. Convalescent prisoners will be sent to permanent depots as often as may be convenient.

#### THE COMMISSARY-GENERAL OF PRISONERS.

4312. Q. When is the office of commissary-general of prisoners created, and what duties are connected with it? A. In time of war a commissary-general of prisoners will be announced, and all

communications relating to prisoners will pass through him. Depots for prisoners will be designated by the Secretary of War, to which suitable and permanent guards will be assigned, the whole to be under the orders of the commissary-general of prisoners. He will establish regulations for issuing clothing, and will direct the manner in which funds arising from the saving of rations at the prison hospitals or stations shall be accounted for and disbursed, to provide such articles as he may deem necessary for the welfare of the prisoners. He is authorized to grant paroles, on the recommendation of the medical officer attached to the prison, in cases of extreme illness, but under no other circumstances.

4313. Q. How are the guards for depots and prison-stations detailed? A. If not otherwise provided, guards for depots and prison-stations will be detailed by the commander of the department in which such depots are situated on the application of the commissary-general of prisoners. Such guards will not be relieved or changed without informing him of the fact; but all returns and reports of these guards will be made to the department commanders, who are responsible for their discipline, as in the case of other troops.

4314. Q. What reports will the commanders of prison depots make to the commissary-general of prisoners? A. The commissary-general of prisoners has authority to call for such reports from officers commanding depots of prisoners as may be necessary for the proper discharge of his duties.

4315. Q. What kind of record will be kept of prisoners, and where will it be preserved? A. A full record of all prisoners of war will be kept in the office of the commissary-general of prisoners, in suitable books, giving the name, rank, regiment, and company or corps of each military prisoner, and the residence of each civil prisoner, with the charges against him, and the time and place of his capture or arrest. Any special information of importance will be added from time to time in the column of remarks. When disposed of by exchange, parole, or release, the fact of such disposal, the authority for it, and the date will be noted on the record.

#### PAROLE AND EXCHANGE OF PRISONERS.

4316. Q. What are the rules relative to the exchange and release of prisoners of war? A. The exchange of prisoners, and the release of officers on parole, depend on the orders of the War Department. The release of prisoners of war by exchange is the general rule; release by parole is the exception. The exchange of prisoners is made under a cartel, mutually agreed upon by the belligerents, stating at what times, in what manner, and at what rates the exchange shall be made and the prisoners delivered.

4317. Q. Whence must a declaration of exchange emanate, and in what way are commanders charged with exchanges restricted? A. A declaration of exchange can only properly emanate from the office of the adjutant-general. Whenever commanders are authorized to make exchanges, their authority is restricted to the delivery of prisoners of war and to the receipt of others as equivalents. They will furnish the commissary-general of prisoners with lists of all persons thus received and delivered, upon the receipt of which the order declaring the exchange will be issued by the adjutant-general. Such lists should be full as to names, rank, place of capture, and place and date of delivery.

4318. Q. What is a parole? A. The parole is a promise, given by an individual of the enemy, by which, in consideration of certain privileges or advantages, he pledges his honor to do, or refrain from doing, certain acts. The pledge of the parole is an individual but not a private act.

4319. Q. What is the rule regarding paroles on the battle-field and in capitulations? A. No paroling on the battle-field, no paroling of entire bodies of troops after a battle, and no dismissal of large numbers of prisoners with a general declaration that they are paroled, is permitted. In capitulations for the surrender of fortified places the commanding officer may, in case of urgent necessity, agree that the troops under his command shall not fight again during the war, unless exchanged.

4320. Q. When paroles are given, what must there be an exchange of? A. When paroles are given and received there must be an exchange of two written documents, in each of which the conditions of the parole and the name and rank of the paroled individual are accurately and truthfully stated.

4321. Q. What persons are permitted to give their paroles? A. Commissioned officers only are allowed to give their paroles; and they can give them only with the permission of their superiors, so long as a superior in rank is within reach.

4322. Q. Under what circumstances may an enlisted man be paroled? A. An enlisted man cannot give his parole except through an officer. Paroles not given through an officer are void, and subject the individuals giving them to punishment. The only admissible exception is where individual enlisted men, separated from their commands, have suffered long confinement without the possibility of being paroled through an officer.

4323. Q. To whom does the parole chiefly apply? A. The parole applies chiefly to prisoners of war whom the captor allows to return to their country, or to live in greater freedom within the captor's territory, on conditions stated in the parole.

4324. Q. What is the usual pledge given in the parole? What are the penalties for violation of it, and what may the paroled individual engage in? A. Not to serve during an existing war, unless exchanged. This pledge refers only to active service in



the field against the paroling belligerent or his allies. The breach of such a parole can be punished with death. The pledge of the parole, however, does not refer to internal services, such as recruiting, mustering, or drilling recruits; fortifying places not besieged; quelling civil disorder; fighting against belligerents in no way connected with the paroling belligerents; or to any civil or diplomatic service upon which the paroled officer may be employed.

4325. Q. What must be done if the Government does not approve of the parole given? The officer giving it must return into captivity. Should the enemy refuse to receive him, he is absolved from all obligation.

4326. Q. What declarations are made by governments regarding paroles? A. A belligerent government may declare, by a general order, whether it will allow paroling, or on what conditions it will allow it. Such orders are communicated to the enemy.

4327. Q. Is a prisoner of war compelled to parole himself? A. No prisoner of war can be forced, by the hostile government, to parole himself; and no government is obliged to parole prisoners of war, or to parole all captured officers if it paroles any. As the pledge of the parole is an individual act, so is paroling, on the other hand, an act of choice on the part of the belligerent.

4328. Q. What is required whenever prisoners of war are released on parole and sent through the lines? A. The officer who releases them will immediately send descriptive rolls to the adjutant-general, containing an exact list of the prisoners, with rank, regiment, and company, date and place of capture, and parole. These rolls are indispensable in effecting exchanges of prisoners.

4329. Q. Who takes charge of paroled officers and men of the U. S. Army, as well as all correspondence relating to them? A. The commissary-general of prisoners.

#### MARCHES.

4330. Q. What determines the order of march of an army? A. The strength of the army, the objects to be accomplished, the position of the enemy, and the number of available roads, the number of columns, and the character of troops of which each column is composed. The intervals between columns should be such as will enable them to readily communicate with and mutually sustain each other, and to reunite with facility whenever necessary.

4331. Q. When should "the general" be sounded, and what is it the signal for? A. One hour before the time designated for marching is the signal to strike tents, load wagons, pack animals, and send them to the place of assembly.

4332. Q. Of what troops is the advance and rear guard formed?

What should be their strength and composition, and where located in the march? A. The advance and rear guard are ordinarily formed of light troops. Their strength and composition in different arms are regulated according to the nature of the country and position of the enemy. The entire advance-guard does not always precede the column; most of it may be deployed to cover a flank exposed to the enemy's attack. The deployed men will move on the exposed flank, and resist any demonstration on the part of the enemy as best they can, until the column is prepared to meet it.

4333. Q. Where will the pioneers march? A. The pioneers of each brigade or division will be united at the head of the column, when their services are necessary to remove obstacles or overcome difficulties on the roads to be traversed by the troops.

4334. Q. What are the rules governing night marches? A. Night marches should not be undertaken except for urgent reasons. When made, great caution should be exercised to prevent straggling. Guides will be posted at cross-roads, or at localities where the proper route may be difficult to determine, in order to point out the direction to be taken.

4335. Q. Who designates the hour for marching, and what should be the order of march? A. The hour of march for each corps, when several are to take the same route, will be regulated by the general-in-chief, or by the senior general present, in case the former has not given his orders on the subject. On the march, when practicable, the battalions of a brigade will, in turn, have the advance, the battalion leading one day being placed in rear upon the following day. Battalions will be marched by the right and left flanks alternately, so that the head of a battalion column upon one day will become its rear on the day succeeding. The led horses of officers, and the horses of dismounted men, follow their regiments. When the general orders the field-train and ambulances to take places in the column, he designates the position they shall take.

4336. Q. How often should a column halt, and how will commanders keep posted on the condition of their commands? A. The column will halt as often as the object of the march and the distance to be traversed will permit. Frequent and short halts serve the purpose of resting and re-forming the troops, enabling them to adjust their equipments and to obey the calls of nature. Commanders of divisions, brigades, and regiments frequently send officers to the rear to see that the troops of their commands march in the prescribed order and keep their distances. To quicken the march, the general warns the colonels, and may direct a prescribed signal to be sounded, which will be repeated in all the regiments.

4337. Q. What restrictions are placed on firing or giving signals from a column en route? A. On the march, no one shall

fire a gun, or give the signal for the halt or march, unless ordered to do so.

4338. Q. In what manner should troops be assembled? A. When it can be avoided, troops should not be assembled at places where they will impede the movements of other troops. A staff officer should be sent by the division commander to the appointed rendezvous to receive them as they arrive, and place them in their proper positions in order of battle, or of march, as may be contemplated. •

4339. Q. If two corps advancing in opposite directions meet on the same road, what is done? A. Each passes to the right, unless their future routes require otherwise, and both continue the march, if the road is sufficiently wide; if it is not, the first in order of battle takes the road, and the other halts.

4340. Q. What rule must be enforced with regard to corps meeting at cross-roads? A. A corps in march must not be cut by another. If the corps meet at cross-roads, that which arrives last halts if the other is in motion. A corps in march passes a corps at a halt, if it has precedence in the order of battle, or if the halted corps is not ready to move at once.

4341. Q. What is the rule regarding a column that halts to allow another to pass? A. It resumes the march in advance of the latter's train. If a column must pass a train, the train halts, if necessary, until the column passes. The column that has precedence must yield it, if its commander, on seeing the orders of the others, finds that the interests of the service demand it.

4342. Q. What should be provided for those taken sick or disabled on the march? A. A wagon, or ambulance, will be attached to the rear-guard of each battalion, when practicable; and a surgeon will be present to give assistance, and to see that no improper persons are suffered to avail themselves of the transportation. If a man is taken sick, the company commander may direct a corporal to remain with and report him to the surgeon.

4343. Q. What should be done to prevent straggling and its attendant evils? A. Commanding officers of regiments may require the rolls of companies to be called, and results to be reported to them, after the troops are formed for and before commencing the march.

4344. Q. What is required of company commanders to keep men in the ranks? A. Captains will cause an officer to march in the rear of their companies, with instructions not to allow any man to leave the ranks without written permission, and without leaving his arms and equipments with his company if his absence is to be of short duration.

#### JOURNALS OF MARCHES, MILITARY MAPS.

4345. Q. How will field-notes and sketches of routes be made? A. The commanding officer of every body of troops ordered to

march will select a competent person, preferably a commissioned officer, to whom he will intrust the special duty of making the field-notes and sketches, and keeping the journals required for the preparation of a map of the route traversed. The person so selected will be relieved of so much of his routine duties as will enable him to give due attention to the subject. The commanding officer will, daily or more frequently, inspect and verify the notes and journals.

4346. Q. What is required of the officer detailed for topographical duty with a column regarding journals and maps? A. A journal will be kept in note-books, issued by the Engineer Department for that purpose. If they cannot be obtained, it will be kept in books made of sheets folded to half the letter-paper size. Note-books will be freely used, and to guard against loss of valuable data, copies will be made, verified, and retained, and the originals forwarded to Army or Department Headquarters at every available opportunity. Whenever a sufficient halt is made, a map of the route up to that point, together with a report thereon, will be transmitted in the same manner. When passing over known routes, the notes will be kept with the same care as upon routes which are new.

#### CONVOYS AND THEIR ESCORTS.

[This subject is so thoroughly treated under "Minor Tactics" that questions in connection therewith would be superfluous. If it is desired to ask any under this heading, see questions from 3806 to 3837.]

#### MOVEMENT OF TROOPS BY RAIL AND WATER.

4347. Q. When troops are ordered to move by rail or water, what will the commanding officer thereof furnish to the quartermaster, to whom application is made for the necessary transportation? A. (1) An exact return of the command, showing the number of officers, enlisted men, and animals, and weight of baggage to be transported. (2) A copy of the order directing the movement. Sufficient notice will be given in every case to enable the Quartermaster's Department to prepare the requisite transportation. The length of such notice will depend upon the urgency of the movement, the strength of the command, and the amount of railway or water transportation available.

4348. Q. When moving by rail, what will the commanding officer of the detachment do as soon as transportation is provided? A. It will be carefully inspected by the commanding officer of the detachment, to see that the cars are in proper condition, and sufficiently supplied with fuel and water.

4349. Q. In the transportation of organized commands, what regulations will be observed? A. The cars will be assigned to

the several companies by the commanding officer, who will cause to be marked, with chalk, on the steps of each passenger car and on the side of each freight or stock car, the designation of the company or detachment to which it is assigned. The field-baggage will be loaded by details from the several companies, under the direction of the quartermaster of the detachment or command. The rations, forage, and a sufficient number of buckets to water the animals of each company will be so loaded as to be readily accessible. Artillery carriages, army wagons, and other vehicles will be transported on platform cars, and will be lashed, if need be, to keep them in place.

4350. Q. If the command consists of cavalry or light artillery, how will it proceed to embark by rail? A. Each company will form in line opposite the cars that its animals are to occupy, where it will dismount, and unsaddle or unharness. The horses will be loaded under the direction of the company commanders, after which the horse equipments (each set secured in a separate bundle), and the harness of light artillery (inclosed in harness sacks, each marked with the designation of the horse, team, and carriage to which it belongs), will be loaded in the cars set apart for that purpose.

4351. Q. After the field-baggage and animals have been loaded, how will the men be put on board? A. The companies will be formed each one opposite the car or cars it is to occupy, and will enter the same under the direction of its company officers. Each soldier will retain possession of his arms unless arm-racks have been provided. Equipments and accoutrements will be placed under the seats. Arms will never be placed on the car-floors.

4352. Q. What is required of company and detachment commanders en route by rail? A. They maintain order in their commands during the journey. They will inspect them frequently and will not allow the cars to be damaged. During halts the cars will if practicable be thoroughly policed, and water and fuel will be placed on board. On long journeys animals will be unloaded at least once in every twenty-four hours, if possible—advantage being taken of stock-yards, at convenient points on the route, and particular attention will be paid to grooming and feeding. When the train is ready to proceed, the "assembly" will be sounded and the troops will be re-embarked.

4353. Q. What is the order of disembarkation by rail? A. At the end of the journey the troops will be disembarked, and the animals unloaded under the direction of the company commanders. The baggage will be unloaded by details from the several companies under direction of the quartermaster. The commanding officer will then cause the cars to be inspected. If it is found that they have been damaged by the troops, he will call a board of survey to investigate the circumstances; to ascertain the amount of damage, and to report the party or parties respon-

sible for it, against whom he will proceed as contemplated in the fifty-fourth Article of War.

4354. Q. What will military commanders charged with the embarkation of troops, and officers of the Quartermaster's Department intrusted with the selection of transports see to particularly? A. They will see that the vessels employed are entirely seaworthy and proper for such service, and that suitable arrangements are made in them for the health and comfort of the troops.

4355. Q. If, in the opinion of the officer commanding the troops to be embarked, the vessel is not proper or suitably arranged, what will be done? A. The officer charged with the embarkation shall cause her to be inspected by competent and experienced persons.

4356. Q. In inspecting water transportation for troops, how must the inspector be governed? A. By circumstances and necessities, but not to the extent of endangering life. Ordinarily, and especially in voyages of any length, vessels that would furnish reasonable comfort to passengers must be provided. If there be anything to indicate necessity for a critical inspection, the services of an expert will be employed.

4357. Q. What is the duty of an inspector of water transportation? A. The inspector will call for the written contract, if there be one, and see that its stipulations are complied with. He will report whether the vessel is adapted to the purpose and voyage designed, or in what particular, if any, she may be defective, and whether any repairs or alterations are necessary before sailing. He will ascertain how the vessel is rated at the underwriters, the apparent age of the hull and machinery, and their existing condition. He will inquire when the vessel was last in dock, the condition of the engines and boilers, and ascertain when they were put in. He will examine whether the pumping machinery outfit of tackle, spare spars, etc., are sufficient; whether there is an ample provision of boats, life-buoys, and spare parts of machinery, and whether there is sufficient deck-room for quarters for officers and enlisted men, and will see that the limit of tonnage and passengers prescribed by law is not exceeded. He will see that the vessel's crew is large enough for her proper working, and inquire into the competency of the officers; he will see that the proper instruments of navigation, compasses, etc., are provided. He will report if the chronometers have been rated, and if there is a supply of charts. The distilling apparatus, water-tanks, and butts will be examined to see if there is sufficient water for passengers and crew. He will especially inspect the cooking arrangements, see that the vessel is clean, and that the portion occupied by troops is dry and well ventilated.

4358. Q. What is required to secure and preserve discipline, provide against disaster from the elements, or attack by the enemy on a transport vessel? A. The senior officer in the military

service, present upon any transport, will assume command of the troops (unless he finds, on going on board, a commander already designated by proper authority), and he will take all necessary measures to put his command into the best state of efficiency to meet any emergency, and will enforce an observance of the requirements of the Army Regulations.

4359. Q. What will be done immediately after troops have embarked? A. At the earliest moment after the embarkation, the troops will be inspected, organized into detachments or companies, officers and quarters being assigned to each organization. So far as practicable the men of each company will be assigned to the same part of the vessel, and squads to contiguous berths.

4360. Q. What will be done with the arms and ammunition of troops embarked on a transport? A. Arms will be so placed, if there be no racks, as to be secure from injury, and enable the men to reach them promptly. Ammunition and cartridge boxes will be secured from fire; reserve ammunition to be reported to the master of the transport, with request that he designate a safe place of deposit.

4361. Q. How is the guard duty on shipboard arranged? A. The guard will be proportioned according to the number of sentinels required. At sea the guards will mount with side-arms only. Sentinels will be kept near the fires, with buckets of water at hand, promptly to extinguish them if necessary.

4362. Q. What are the rules with regard to lights and smoking? A. Smoking will not be allowed between decks or in the cabins; nor shall lights be permitted between decks, except such ship-lanterns as the master of the transport may direct, or those carried by the officer of the guard in the execution of his duty.

4363. Q. What will be done with regard to calling troops to quarters in the event of alarms? A. The commanding officer will make arrangements in concert with the master of the vessel for calling the troops to quarters, so that in case of alarm on account of storm or fire, or the approach of an enemy, every man may repair promptly to his station; but he will take care not to crowd the deck. The troops not required at the guns or to assist the sailors, and those who cannot be advantageously employed with small arms, will be formed as a reserve between-decks.

4364. Q. When and how will troops be inspected on transports? A. All the troops will turn out for inspection at a prescribed hour in the morning without arms (in warm weather without shoes or stockings), when every individual will be clean—his hands, face, and feet washed and his hair combed. The same personal inspection will be repeated thirty minutes before sunset. The cooks may be exempted from one of these daily inspections if necessary.

4365. Q. How will cleanliness be preserved on transports?

A. Officers will enforce cleanliness. The weather permitting, bedding will be brought on deck every morning for airing. In harbor, where there is no danger from sharks, the men may bathe, but not more than ten at a time, and attended by a boat.

4366. Q. How often will between-decks be washed? A. Between-decks will not be washed oftener than once a week, and only when the weather is fine. The boards of the lower berth will be removed once or twice a week to remove the straw. Under the direction of the surgeon and the officer of the day, frequent fumigations will be performed between-decks.

4367. Q. What is required with regard to wind-sails on a transport? A. During voyages in hot weather the master of the vessel will be required to provide wind-sails, which will be constantly hung up, and frequently examined, to see that they draw well and are not obstructed.

4368. Q. What is required regarding the preparation of food for troops on transports? A. During cooking-hours officers of companies visit the caboose, and see that the food is properly prepared. The coppers and other cooking-utensils are to be regularly washed, both before and after use, and frequently scoured.

4369. Q. When will bedding be replaced in births and what is required regarding the men turning in? A. The bedding will be replaced in the berths at sunset, or at an earlier hour when there is prospect of bad weather. At taps every man not on duty will be in his berth. To insure the execution of this regulation, the officer of the day will inspect between-decks.

4370. Q. What is the officer of the day charged with regarding lights on a transport? A. Lights will be extinguished at tattoo, except such as are placed under sentinels. The officer of the day will attend to this requirement, and report to the commanding officer. Officer's lights will be extinguished at 10 o'clock, unless special permission be given to continue them for a longer time.

4371. Q. What exercise will be given to troops on transports? A. The troops will occasionally be called to quarters by the beat "to arms." Those appointed to the guns will be frequently exercised in their use. The arms and accoutrements will be frequently inspected. The metallic parts of the former will be often wiped and oiled. They will be encouraged, and required, to take exercise on deck in squads, by succession when necessary. Recruits, and all enlisted men requiring it, will be frequently drilled in the manual of arms.

4372. Q. What is required of the medical officers on transports with troops? A. At morning and evening parades the surgeon will examine the men, to observe whether they exhibit any indications of disease. The sick will, as far as practicable, be separated from the well. On the first appearance of malignant contagion a signal will be made for the hospital vessel (if there be one in the company), and the sick removed to her. A good supply of hos-



pital stores and medicines will be taken on each vessel, and used only for the sick and convalescent. The surgeon will warn the men against costiveness on approaching a hot climate. In passing the West Indies to the southern coast, for instance, and for some weeks after landing in that latitude, great care is required in the use of fruit, as strangers are not competent to judge of its effects, and most kinds after long voyages are injurious.

4373. Q. What will the commanding officer, on arriving in sight of port, require? A. Written reports of the voyage from the senior officer of each staff department on board. These reports he will transmit, with his own, through the proper channel to the Adjutant-General. The reports should give any facts of interest relating to the accommodation and health of the troops, the manner in which the officers and crew of the transport have performed their duties, the length of the voyage, and any observations which may enable the War Department to detect and correct abuses and punish neglect.

4374. Q. How should stores be shipped to accompany a military expedition? A. In loading vessels with subsistence supplies or other stores for a military expedition the cargo of each should be composed as far as practicable of a full assortment of such ammunition, supplies, and stores as may be needed by the troops upon arrival, that they may be used at once in case of necessity should other storeships be delayed or lost. Stores or supplies should be placed on board so that they may be readily reached in the order in which they may be required. Every storeship should be marked at the bow and stern and on both sides in large characters, with a distinctive letter and number. A list of the stores on each vessel, with the place they are to be found, should be prepared and a copy sent to the chief officer of the proper department, whether he accompanies the expedition or is at the place for which the stores are destined.

4375. Q. What is the rule regarding the quartering and messing when officers of the Army are embarked with troops in a ship in charge of officers of the Navy? A. The latter will occupy the apartments allotted to them, and separate accommodation will be provided for officers of the Army and those under their command. The officers of the Army will mess together and not with the officers of the Navy, unless otherwise agreed upon with the sanction of the commanding officers of the vessel and troops.

4376. Q. To what laws will troops be subject when embarked in any vessel of the Navy? A. Any part of the Army, volunteers or militia, embarked in any vessel of the Navy for duty therein shall, until detached, be subject to the laws for the government of the Navy, and the regulations of the vessel, in the same manner as the marines. Any part of the Army, volunteers, or militia, embarked on a vessel of the Navy for transpor-

tation only, shall not be subject to the laws and regulations of the Navy, but to the laws for the government of the Army; but shall, nevertheless, be subject and conform to the regulations of the vessel, upon pain of confinement by its commanding officer while on board, and of such punishment as an Army court-martial shall direct after landing.

4377. Q. What are the rules governing Army courts-martial or punishments on vessels of the Navy? No Army court-martial shall be held on board any vessel of the Navy, when in commission; nor shall army, volunteer, or militia officers order any public punishment, or confinement in irons to be inflicted on board without in every case the previous approval of her commanding officer.

#### TRANSPORTATION OF HORSES.

4378. Q. What is of primary importance on board of transports for horses, and how provided for? A. Ventilation is of primary importance, the safety and condition of the horses mainly depending upon their having plenty of fresh air. Large air-ports or scuttles are indispensable, and wind-sails down every hatch, to each deck, will be insisted upon. If time permits, fixed air-shafts should be provided for each deck. The ventilation of steamers may be assisted by using the donkey-engines for this purpose.

4379. Q. How should horses be provided with stalls on a transport? A. Stalls are preferable between-decks; never, if it can be avoided, in the hold. Should horses be put on the spar-deck, nothing will be stowed on the stall-sheds. Stalls should be about six and one half feet long, and twenty-eight inches wide; tail-boards fastened to the rear-posts, and padded as low as the hock; breast-boards and side-boards fitted in grooves about four feet from the floor, the first padded on the inner side and upper edge, the latter on both sides; the floors of the stalls set on blocks, that the water may pass under them; four slats across each floor to give the horses foothold. Troughs should be made to hang with hooks, so as to be easily removed. Before the embarkation the side-boards will be removed, and replaced as each horse is put in his stall.

4380. Q. How should horses be embarked on a transport? A. In embarking horses from the wharf they are slung; or, if the height of the vessel's sides permit, they are led by ramps to the deck, and then lowered. If the transport cannot lie at a wharf, the horses are brought alongside in lighters and transferred by slings. In hoisting horses on board the slings are made fast to a hook at the end of the fall, or the knot is tied by an expert seaman, so that it will be well secured and easily loosed. Each horse is run up quickly to prevent him from plunging, his ascent and descent being regulated by two guys attached to the halter—

one held on the wharf or lighter, and the other on the transport. A portable stall may also be employed, into which a horse may be led; the stall is then hoisted by a donkey-engine. Horses will not be put on board after severe exercise nor unless perfectly cool.

4381. Q. How will horses be cared for regarding their health on transports? A. Horses must not be overfed, and bran should form part of their diet. At the usual hour for stable duty the eyes and nostrils of each horse should be wiped with a wet rag. Occasionally the nostrils will be sponged with vinegar and water and the troughs washed. Should any contagious disease appear, the animal attacked will be promptly killed and thrown overboard, and precautions against infection taken.

#### GRAND GUARD AND OUTPOSTS.

[This subject being treated of under "Minor Tactics," questions are omitted here. Q. and A., however, will be found from Nos. 3368 to 3510.]

#### SIEGES.

4382. Q. Who is the director of a siege? A. The commanding general; or he may select a general officer as "Director of the Siege," who, under the instructions of the commanding general, shall have immediate charge of all the siege operations.

4383. Q. What constitutes the preliminaries to a siege? A. The commandants of engineers and artillery accompany the first troops before the place to examine the works and approaches. When the engineers have completed the reconnaissance of the works and of each front as far as practicable, the commander of engineers makes as exact and detailed a plan thereof as possible, and, under the instructions of the general commanding, draws up the general plan of the siege, and discusses it with the commandant of artillery in regard to the best employment of that arm. These officers then submit their joint or separate opinions to the general, who decides on the plan of the siege, and give the orders for its execution. The commandant of the engineers directs the construction of all the siege-works, under the authority of the general, and lays before him every day a report of operations and a plan showing the progress of the attack. The commander of artillery makes daily reports to the general of all that relates to his branch of the service.

4384. Q. How are the troops encamped during a siege? A. The divisions, brigades, regiments, and battalions are encamped, during the siege, in the order of battle, or in such formation as the commanding general may prescribe.

4385. Q. What officers serve as general of the trenches, and what are their duties? A. The brigade commanders serve, in

turn, as general of the trenches—one or more being detailed daily, according to the front and number of attacks; they superintend the operations, and dispose the guards of the trenches to repulse sorties and protect the works.

4386. Q. What is required of the colonels and lieutenant-colonels of infantry during a siege? A. In each division the colonels and lieutenant-colonels of infantry alternate for duty in the trenches; one or more are detailed daily; they superintend the service of guards and workmen in the part of the work to which the general of the trenches assigns them, being posted with troops of their own regiments in preference. The commander of the siege may place the colonels on the roster with the brigadier-generals.

4387. Q. Can the cavalry be employed in the trenches? A. The cavalry is employed in outpost service; in detachments placed in observation to protect the siege, and in escort to convoys. When these duties are not sufficient to employ them they take their share of duty in the trenches.

4388. Q. What is required of the commanders of divisions during a siege? A. The commanding general of each division appoints a field-officer of the trenches, who is aided by one or two subordinate officers. He is charged with all the details relative to the assembling of guards and workmen. He distributes the guards on the different points of the attack agreeably to the orders of the general of the trenches, and forms the detachments of workmen for the engineer and artillery; that he may be prepared for this distribution, he receives every day from the adjutant-general a statement of details for the next day.

4389. Q. What is done on the arrival of the general of the trenches? The field-officer of the trenches gives him all the information necessary to enable him to station the troops; attends him in his visit to the trenches, and takes his orders on the changes to be made in the position of troops. The execution is intrusted to the commanders of the troops. One or more companies of the guards of the trenches are put under his immediate orders for the preservation of order and police.

4390. Q. What kind of trench-service does the infantry perform? A. The infantry has two kinds of siege-service—the guard of the trenches and the work of the trenches.

4391. Q. How are the guards of the trenches detailed and mounted? A. The guards of the trenches mount every day, by battalions, in such order of detail that all the troops may take an equal share, and no part of the line be left too weak. Battalions of the same division are not taken from the same brigade.

4392. Q. What other details are furnished by troops who guard and work in the trenches? A. The battalions first for detail for guard of the trenches, and the companies first for detail for work in the trenches, furnish no other details, but are held in reserve.

4393. Q. When should the troops for guard in the trenches be detailed? A. The battalions for guard are detailed at least twelve hours in advance; they furnish no other details during their tour. If a whole regiment be detailed, it leaves a sufficient police-guard in camp.

4394. Q. What restrictions are placed upon the detail of workmen for the trenches? A. For twenty-four hours before mounting guard in trenches, the battalions detailed for guard do not furnish workmen and the companies of those battalions whose tour it would have been to work in the trenches do not work for twenty-four hours after guard.

4395. Q. What is the method of obtaining workmen for the trenches? A. The chiefs of engineers and artillery make requisitions for workmen in advance, that details may be made in time to prevent delay. They should exceed the exact number required, that there may be a reserve for unforeseen wants.

4396. Q. How is the detail for work in the trenches made? A. The detail for work in the trenches is by company, from all the regiments at one time, or in turns; it continues generally twelve hours. The detail from a regiment should never be less than a company.

4397. Q. How are workmen needed for other work than the trenches detailed? A. Workmen required for other work are taken by roster from the battalions not employed in the trenches.

4398. Q. How should guards and workmen march to the trenches? A. Guards and working-parties march to the trenches in silence, fully armed and equipped. Their arms are kept near them while at work. Everything likely to attract the attention of the enemy is avoided, especially on the day the trenches are opened. For this purpose the hour of relieving guards may be varied.

4399. Q. What is required of the field-officer of the day before troops commence work in the trenches? A. Before the guards and workmen march, the field-officer of the trenches arranges them so that each detachment can reach its ground without confusion. The troops are posted in the trenches according to the position of their regiments in order of battle. The reserves of workmen are placed at the depot of the trenches, or the nearest suitable place to the works.

4400. Q. What do the workmen carry to the trenches, and how do they and the guards enter and leave the trenches? A. The workmen, in going to the trenches, carry such tools and materials as are required by the engineers and artillery. The guards enter and leave the trenches with arms trailed, and the workmen also unless they carry materials or tools, when their arms are slung. A corporal is sent to the opening of the trenches to guide the relief.

4401. Q. For what purpose are sandbags used in trench-work?

A. Sandbags are placed on the parapet, at intervals, to cover the sentinels ; they are more numerous than the sentinels, so that the enemy may not know where the sentinels are placed.

4402. Q. What is done when detachments are posted at night, in advance of the trenches, to cover the workmen? A. The men lie down to hide themselves better from the enemy. To prevent mistakes, the workmen are told what troops cover them.

4403. Q. What honors are paid in the trenches? A. No honors are paid in the trenches. When the general commanding the siege visits them, the guards place themselves in the rear of the banquette. The colors are never carried to the trenches, unless a regiment marches to repulse a sortie or make an assault. Even in this case they are not displayed until the general commanding the siege gives a formal order.

4404. Q. Where are the tools for trench-work collected, and who has charge of them? A. Tools and siege materials of all kinds are collected in such places as the field-officer of the trenches may appoint, on the advice of the commanders of artillery and engineers. They are in charge of officers of engineers and artillery, with guards or non-commissioned officers of both corps.

4405. Q. What is done in case of a sortie? A. The guards move rapidly to the places designated by the general of the trenches. Having lined the banquette to fire on the enemy, the troops form on the reverse of the trench to receive him. The workmen take arms and retain their positions, or retire with their tools, as ordered. The officers commanding the detachments of workmen see that their movements are made promptly and without confusion.

4406. Q. How should the troops that advance beyond the trenches to repulse the sortie proceed? A. They must not follow in pursuit. The general takes care that they return to the trenches before the retreat of the sortie allows the artillery of the place to open on them. When the workmen return, the officers and non-commissioned officers of the detachments call the roll without interrupting the work, which is immediately resumed.

#### ASSAULTS.

4407. Q. In making assaults, what should the troops be supplied with? A. However practicable the breach may appear, or however ruined the works in rear of it, the heads of columns must always be supplied with ladders to get over unexpected obstacles.

4408. Q. What is required regarding property in the event of a successful assault on a place? A. The general commanding the siege causes picked companies to be designated to protect property and persons, and prevent pillage and violence, from the moment the place is carried. The officers exert themselves to

restrain the men. The General designates the place requiring particular protection, such as churches, asylums, hospitals, colleges, schools, and magazines. The order for their protection should remind the soldiers of the penalty of disobedience. Whether the place be taken by assault or by capitulation, the provisions and military stores and the public funds are reserved for the use of the Army.

4409. Q. What returns and reports are the officers of engineers and artillery required to make in regard to a siege? A. The officers of engineers and artillery make, to the general of the trenches, a return of all losses in their troops, and such other reports on the work as he requires in addition to the reports direct to their respective chiefs on the details of the siege.

4410. Q. What is the commander of engineers required to keep during a siege? A. The commander of engineers will keep a journal of the siege, showing the operations of each day in detail, the force employed, the kind and quantity of materials used. He will also note on a plan the daily progress of the works, and make the necessary drawings explanatory of their construction.

4411. Q. What report will the field-officer of the trenches make? A. At the end of each tour the field-officer of the trenches will draw up a report, for the preceding twenty-four hours, to the general of the trenches.

4412. Q. What report will the commander of the troops in the trenches make? A. The commanders of the several corps in the trenches report, when relieved, to their respective headquarters, their losses during the tour, and the conduct of the officers and men.

4413. Q. What is the commander of the artillery required to keep during a siege? A. The commander of the artillery will keep a daily journal of the operations under his direction, showing the number and kind of pieces in battery, the forces employed in serving them, the kind and quantity of ammunition expended, the number of rounds fired from each piece of ordnance, the effect of the fire, and all other particulars relative to his branch of the service.

4414. Q. What is done with the journals and drawings after a siege? A. The journals and drawings will be sent, after the siege, with the report of the general commanding, to the War Department.

#### DEFENSE OF FORTIFIED PLACES.

4415. Q. What is required of the commander of a fortified place regarding his preparations for defense? A. In war every commander of a fortified place shall always hold himself prepared with his plan of defense, as if at all times liable to attack. He arranges this plan according to the probable mode of attack; determines the posts of the troops in the works, the reliefs,

reserves, and details of service in all the corps. He draws up instructions for a case of attack, and exercises the garrison according to his plan of defense. In framing his plan he studies the works, and the exterior with the radius of attack and investment, the strength of the garrison, the artillery, the munitions of war, subsistence and supplies of all kinds, and takes immediate measures to procure whatever is deficient of troops or supplies, either by proper requisitions, or from the means at his disposal.

4416. Q. What is required of the commander of a fortified place in time of war on the approach of an enemy? A. On the approach of an enemy, he removes all houses and other objects, within or without the place, that cover the approaches, or interrupt the fire of guns or movements of troops. He assures himself personally that all posterns, outlets, embrasures, etc., are in proper state of security.

4417. Q. What is the commander of a fortified place furnished with from the War Department? A. He shall be furnished by the War Department with a detailed plan of the works: with a map of the environs within the radius of investment; with a map of the vicinity, including the neighboring works, roads, water-channels, coasts, etc.; with a memoir explaining the situation and defense of the place, and the relations and bearings of the several works on each other, and on the approaches by land and water—all of which he carefully preserves, and communicates only to the council of defense.

4418. Q. Who should the commander of a fortified place consult? A. He consults his next in rank and the senior officers of the engineers and artillery, either separately or as a council of defense. In the latter case he designates an officer to act as secretary to the council and to record its proceedings and the joint and separate opinions of the members, which are kept secret during the siege. The members record their own opinions over their own signatures. In all cases the commander decides on his own responsibility.

4419. Q. Who are required to keep journals in a fortified position? What will they embrace and where will they be sent? A. The commander of the place and the senior officers of engineers and artillery shall keep journals of the defense, in which shall be entered in order of date, without blank or interlineation, the orders given or received, the manner in which they were executed, their results, and every event and circumstance of importance in the progress of the defense. These journals and the proceedings of the council of defense shall be sent, after the siege, to the War Department.

4420. Q. What shall be kept in the office of the commander of a fortified position in a state of defense, and what will be done with the same? A. There shall be kept in the office of the com-



mander of the place, to be sent after the siege to the War Department, a map of the environs, a plan of the fortifications, and a special plan of the front of attack, on which the chief engineer will trace in succession the positions occupied and the works executed by the enemy, and also the works of counter-attack or defense, and the successive positions of the artillery and other troops of the garrison during the progress of the siege.

4421. Q. In defending a fortified place, what is required of the commander with regard to holding the position? A. The commander shall defend in succession the advanced works, the covered way and outworks, the body of the work, and the interior intrenchments. He shall not be content with clearing away the foot of the breaches and defending them by abatis, mines, and all the means used in sieges, but shall begin in good time, behind the bastions or front of attack, the necessary intrenchments to resist assaults on the main work. He shall use his means of defense in such manner as to have at all times a reserve of fresh troops, chosen from his best soldiers, to resist assault, retake the outworks, and especially to resist assaults on the body of the place, and a reserve for the positions of the last period of the siege, and of ammunition for the last attack. He must compel the besieging force to approach by the slow and successive works of siege, and must sustain at least one assault on a practicable breach in the body of the place.

4422. Q. What will be done when the commander thinks that the end of the defense has come? A. He shall still consult the council of defense on the means that may remain to prolong the siege. But in all cases he alone must decide on the time, manner, and terms of surrender. In the capitulation he shall not seek or accept better terms for himself than for his garrison, but shall share its fate and exert his best endeavors to care for the troops, especially the sick and wounded.

4423. Q. What restrictions are placed upon the withdrawal of troops or supplies from a fortified place? A. No commander in the field shall withdraw troops or supplies from any fortified place, or exercise any authority over its commander, unless it has been placed under his command by competent authority.

#### BATTLES.

4424. Q. Before an action, what will the generals indicate? A. The places where they will be; if they change position, they give notice of it, or leave a staff officer to show where they have gone.

4425. Q. What is expected of officers and non-commissioned officers during an engagement? A. That they will keep the men in the ranks and enforce obedience if necessary. Soldiers must not be permitted to leave the ranks to strip or rob the dead, nor even

to assist the wounded, except by express permission, which is only to be given after the action is decided. The highest interest and most pressing duty is to win the victory, by winning which only can proper care of the wounded be insured.

4426. Q. What is required of ordnance officers and quartermasters after an engagement? A. After an action the officers of ordnance collect the munitions of war left on the field, and make a return of them to headquarters. The Quartermaster's Department collects the rest of the public property captured, and makes returns to headquarters.

4427. Q. What reports of battles, actions, or affairs will be made? A. Within ten days after the close of every engagement, or affair, the commanding officer of each regiment, separate battalion, and light battery concerned will prepare and forward to the next superior headquarters a concise report of the part taken therein by his command, including the effective strength of the same, and the losses incurred, under the separate heads of killed, wounded, and missing. A duplicate of the report will be forwarded direct to the Adjutant-General. Brigade commanders within ten days after the receipt of the reports of the organizations composing them, division commanders within twenty days, and corps commanders within thirty days thereafter, will prepare and forward similar reports to the next superior headquarters. They will be accompanied by appendices containing consolidated reports of the effective strength and casualties of the several commands, of the losses of property incurred, and a nominal list of the officers attached to their respective staffs. Duplicates of these reports will be forwarded direct to the Adjutant-General.

## PART XIV.

### *SPECIAL QUESTIONS.*

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*For Artillery Officers Only.*

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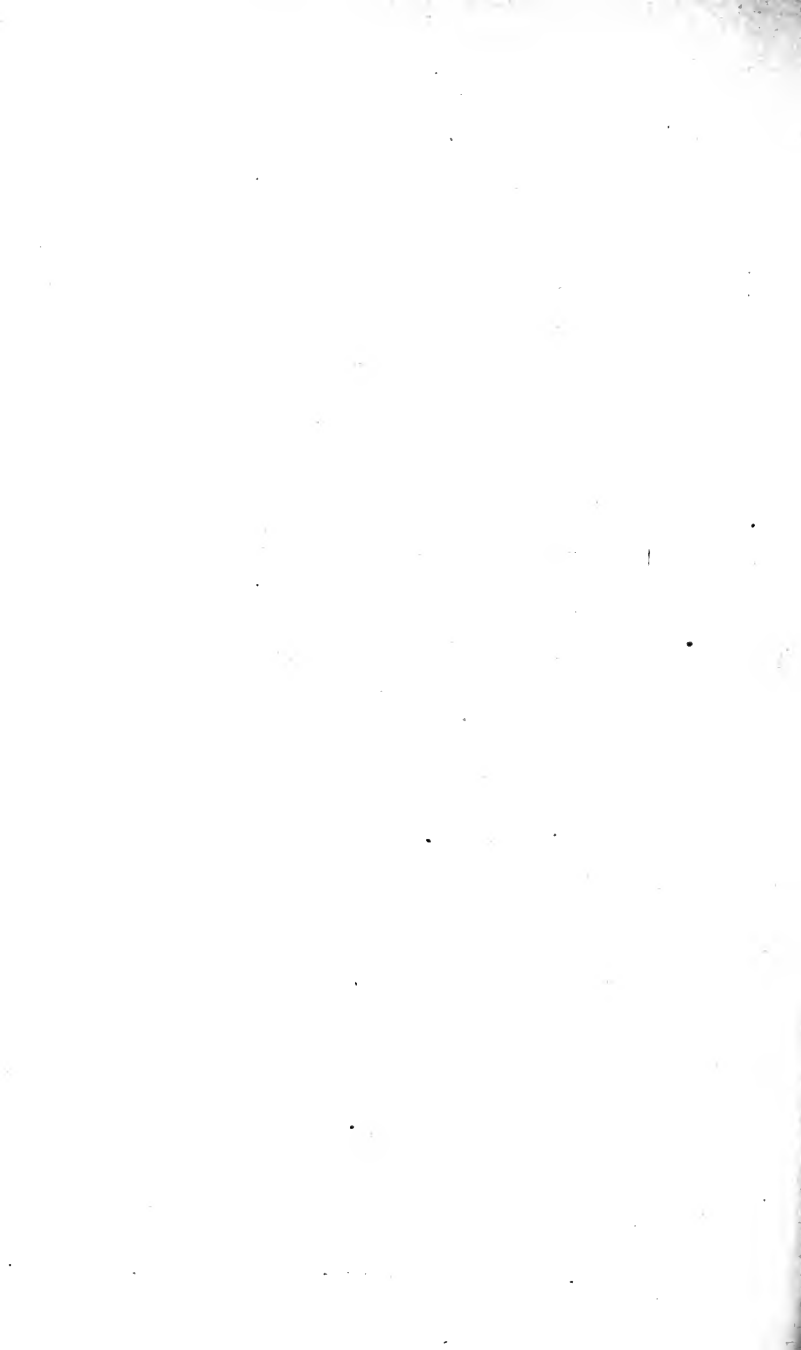
BALLISTICS.—Nos. 4428-4438.

ELECTRICITY.—Nos. 4439-4456.

SEA-COAST DEFENSE.—Nos. 4457-4465.

EXPLOSIVES.—Nos. 4466-4488.

GUNNERY.—Nos. 4489-4551.



## PART XIV.

### *SPECIAL QUESTIONS.*

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#### BALLISTICS.

4428. Q. Describe briefly the general method pursued in determining the muzzle velocity of a projectile by means of an electro-ballistic machine. A. Two targets, each carrying a number of tightly-stretched copper wires, are set up: the first at a given distance from the muzzle of the gun, and the second at a known distance from the first. Each is electrically connected with the ballistic machine, which records the instant the current is broken at each target by the passage of the projectile through the net-work of wires. Having a scale of time, the interval between the breaks thus registered is known, and, being corrected for errors, gives the time of passage between targets; from which the initial velocity is easily obtained.

4429. Q. How is the time consumed by a projectile in passing between the screens determined by the Boulengé chronograph? A. The break of the current of the first target permits the long rod (chronometer) of the instrument to fall. This rod, when in use, is enveloped by a zinc or copper tube, called the recorder, upon which a mark is made by the knife, while the chronometer is suspended from the magnet. The break of the current of the second target causes the small rod (the registrar) to fall, thereby releasing the knife, which makes a mark on the recorder as it is falling. The time corresponding to the distance between the knife-marks, corrected for errors, is obtained, and from this the initial velocity. The time ( $T$ ) corresponding to the distance ( $h$ ) between the knife-marks is obtained from the equation  $T = \sqrt{\frac{2h}{g}}$ , in which  $g$  is the force of gravity.

4430. Q. What is meant by taking the disjunction, and what is its object? A. Obtaining the total error to be applied to the time obtained, as just indicated. This is obtained by breaking both currents at the same instant by means of the disjunctor, thereby determining the height through which the chronometer

falls due to the errors of the instrument. The time corresponding to this height is the sum of the errors to be applied to the time obtained in firing.

4431. Q. Describe the chronometer and register-circuits of a Boulengé chronograph arranged for taking the velocity of a projectile. A. The two rods are suspended from electro-magnets, each having its own current and its own target, and are independent of each other. The targets consist of wooden frames carrying a number of tightly-drawn copper wires the distances between which are such that it would be impossible for the projectile to pass through without breaking a wire. The current entering on one side of the target must traverse the whole system of wires before passing out on the other side, so that the breaking of any wire will break the current.

4432. Q. Referring to a charge of gunpowder, define the terms *ignition*, *inflammation*, and *combustion*. A. *Ignition* is the setting on fire of a particular point of a grain or charge. *Inflammation* is the spreading of the fire from point to point on the surface of the grain, or from one granular surface to another throughout the charge. *Combustion* is the propagation of the fire into the interior of the charge or grain.

4433. Q. Define the terms *gravimetric density* and *absolute density* as applied to gunpowder. A. *Gravimetric density* is the weight of a standard volume of the powder not pressed together except by its own weight—i.e., *it is the specific gravity of powder in its natural form*. *Absolute density* is the ratio of the weight of a given quantity of powder to the weight of an equal volume of water at the standard temperature—i.e., *it is the specific gravity of solid powder*.

4434. Q. Give the difference of behavior of two charges of powder in the same gun, the charges differing in this respect only—that one charge consists of small-service grains and the other of large-service grains. A. Enlarging the grain decreases the velocity of emission in the first instants, and afterwards causes it to fall off more slowly; hence the small-grain charge would give a quick, high pressure, whereas the large-grain would give a lower, gradual, uniform pressure. In other words, the first would be like a blow and the second like a push.

4435. Q. Define *density of loading*, and show how it is determined for any gun and charge. A. It is the ratio of the weight of the charge of powder to the weight of the water, at its maximum density, which will completely fill the volume in which the charge is fired.

4436. Q. Define the following terms employed in Exterior Ballistics: *trajectory*, *angle of departure*, *angle of fall*, *direct fire*, *curved fire*, *high-angle fire*. A. *Trajectory*: the curve described in the centre of gravity of the projectile. *Angle of departure*: the angle which the line of departure makes with

the horizontal plane. *Angle of fall*: the angle which the tangent to the trajectory at the point of fall makes with the horizontal plane passing through the muzzle. *Direct fire*: the fire of guns with full charges at angles of elevation not exceeding  $15^\circ$ . *Indirect fire*: the fire of guns with reduced charges, howitzers, and mortars at angles of elevation not exceeding  $15^\circ$ . *High-angle fire*: the fire of guns, howitzers, and mortars at angles of elevation exceeding  $15^\circ$ .

4437. Q. What is meant by *centre of impact* as applied to a group of hits on a target? Give one or more of its properties. A. It is the central-point of a group of shots fired under the same conditions at a given target; and the algebraic sums of the horizontal and vertical distances of each shot from this point are zero. Hence the shots are symmetrically grouped about this point; also, if horizontal and vertical wires be drawn through it, the number of hits in each of the quadrants will be nearly equal, and the ratio of these numbers very nearly unity.

4438. Q. Define *mean* and *probable* deviation. A. *Mean deviation* is the sum of the absolute deviations divided by the number of shots. *Probable deviation* is the deviation with respect to which the probabilities of obtaining greater or less deviations are equal.

## ELECTRICITY.

4439. Q. Explain why greater heat is generated in the bridge of an electric fuse than in any other equal length of the circuit. A. Because the resistance is greater.

4440. Q. Name all the different methods of generating electricity. A. Friction-machines, including hydro-electric of Armstrong; induction-machines (as Holtz, electropones, etc.); batteries (voltaic); thermo-electric batteries; dynamo-machines, including the various forms.

4441. Q. How would you determine whether a given wire was carrying a current or not? If there is any way without opening the circuit, state it. A. By means of the magnetic needle.

4442. Q. What kinds of cell should be used (a) with the Morse telegraph; (b) for firing fuses? A. (a) Daniell's gravity cells; (b) Nitric-acid and chromic-acid cells.

4443. Q. What number of volts is regarded as dangerous to human life? A. 1000 and above.

4444. Q. May either the arc or the incandescent lamp be employed to light the interior of a powder magazine? A. *Incandescent* only—safest and best illuminant for the purpose known.

4445. Q. What is the object (a) of a galvanometer; (b) of a Wheatstone bridge? A. (a) The *galvanometer* measures the *strength* of a current; (b) the Wheatstone bridge measures *resistances* of conductors of various kinds.

4446. Q. What advantage has the electric motor over all other

means of distributing power? A. Utilization of waste forces of nature; small percentage of loss of efficiency; extreme portability—i.e., carried over long distances with any desired change in direction and intensity.

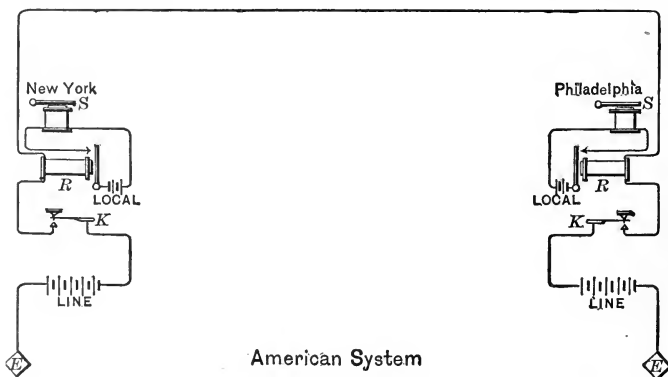
4447. Q. Give Ohm's Law. A. The strength of the current varies *directly* as the electromotive force, and *inversely* as the resistance to the current. This applies to steady currents or currents of constant strength.

4448. Q. What are the practical units of the quantities that enter Ohm's Law? A. The Ampère ( $C$ ), the Volt ( $E$ ), and the Ohm ( $R$ ).

4449. Q. Name the essential parts of a dynamo-electric machine, and the part in which the current is generated. A. The apparatus consists of strong electro-magnets, between the pole-pieces of which revolves an armature. The armature is composed of coils of copper wire wound upon a soft iron core. The extremities of the armature wires connect with the strips of the commutator, which is mounted on the axis of the armature. The brushes take the current from the commutator-strips. The current is generated in the armature-coils, and is due to the variation in the number of lines of force cut by the coils, or the number embraced by the coils.

4450. Q. What are the plates, the liquid, the electromotive force, and some of the military uses of the Le Clanché cell? A. The *plates* are zinc and carbon, the latter contained in a porous pot and surrounded by coarse grains of peroxide of manganese and carbon. The *liquid* is sal-ammoniac. The electromotive force is 1.46 volts. Military uses, for bells, telephones, and pointing apparatus, and in France for telegraphing.

4451. Q. Draw a diagram of a simple Morse telegraph circuit for two stations.





4452. Q. Name the various applications of the electric current to military purposes that have come within your reading. A. Telephoning, telegraphing, in pointing guns, applied to torpedoes, firing guns, firing mines, manufacture of shrapnel, lighting, and for welding.

4453. Q. How will the resistance of one copper wire compare with that of another copper wire of equal length and double the diameter? A. That of the smaller will be four times that of the larger.

4454. Q. Why is not the filament at a white heat in an incandescent lamp speedily burned out? A. Because it is in a vacuum.

4455. Q. What is an insulator? Name three or four of the best conductors of electricity. A. A body that offers great resistance to the flow of electricity through it—silver, pure copper, gold, zinc, or iron.

4456. Q. State the principle by which we know that a current is induced in a coil as in a dynamo-machine, and the rules for the direction and intensity of the current. A. Whenever a coil forming a closed circuit or a part of a closed circuit is revolved in a magnetic field, so as to vary the number of lines of force that are inclosed by the coil, a current is induced in the circuit.

In the dynamo-machine the armature turns, changing the number of lines of force embraced by its coils, and a current flows around the circuit; of which these coils form a part. *Direction:*

*a* = direction of motion of armature;

*b* = positive direction of the lines of force; *c* = (the closed fingers) the direction of the current in coils of a

Siemens armature. *Intensity:* The

strength of the current, or the electro-

motive force induced, due to a given

angular turn, depends upon the rate of cutting of the line of

force, or change in the number embraced by the armature-coils.

4457. Q. What are the objects sought in preparing works of

coast defense, and what are the elements of a first-class system?

A. The objects sought are: 1. To forbid distant bombardment; 2.

To control important anchorages; 3. To close important channels,

which is by far the most common and urgent. This consists in the

effective obstruction of all water approaches against the enemy,

leaving free entrance and exit for a nation's own vessels; protec-

tion for these obstructions, and security for their operation and

their flanking-guns against escalade by boat parties; so heavy a fire

of modern high-power guns and mortars over all the approaches

as to defy the most powerful armored fleet able to operate in the

channels leading to these auxiliary defenses; a heavy flanking

fire of medium rapid-fire guns over the obstructed zone; provi-

sion for offensive returns against armored counter-miners; the

power of illuminating the obstructions by night, so far as this is



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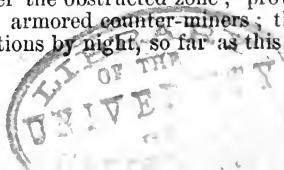
leaving free entrance and exit for a nation's own vessels; protection for these obstructions, and security for their operation and

their flanking-guns against escalade by boat parties; so heavy a fire of modern high-power guns and mortars over all the approaches

as to defy the most powerful armored fleet able to operate in the channels leading to these auxiliary defenses; a heavy flanking

fire of medium rapid-fire guns over the obstructed zone; provision for offensive returns against armored counter-miners; the

power of illuminating the obstructions by night, so far as this is



physically possible ; a swarm of torpedo-boats, which, safe behind the barrier, are always ready to sally out and carry the war to the enemy's fleet when favorable opportunities occur. A nation should, therefore, be prepared for encountering vessels with guns of the largest calibres that the draught of water in the channel will admit ; from five to ten ships, carrying from thirty to sixty guns of six-inch calibre and upward, should be estimated for each mile of the line of battle ; the attack to be met will be made at anchor, or at least from fixed buoys, in order to increase the precision of fire, and at as close quarters as possible. The elements of a first-class system are : 1. High-power guns and mortars for keeping the armored ships of the enemy at a distance ; 2. Land fortifications to hold the position ; 3. Obstructions in the channels of approach ; 4. Flanking-guns, movable torpedoes, and the electric light to cover the obstructions ; 5. Vidette and torpedo boats to watch the enemy and make offensive returns.

4458. Q. How may the number of guns likely to be brought against a fort be determined ? A. By drawing on the map, the fort being the common centre, circles with radii varying from one to three miles, and note the lengths that fall on water of sufficient depth for occupation by warships. The nature of the channel and strength of the current will indicate about how near together the ships can be placed. Generally speaking, allow to each vessel six effective guns, of calibres varying from six inches upward, according to her draught. There may be anticipated a possible fire at the rate of thirty to sixty guns per mile of available development, depending on the nature of the site.

4459. Q. Discuss the selection of sites to prevent bombardment or to cover anchorages, and, in this connection, the extreme ranges to be expected of naval guns. A. The sites should be so selected as to keep the enemy beyond the extreme range to the object covered—which would place the defensive works at six miles from the depots, city, etc., to be defended ; and if practicable at reasonable expense, one would even place them ten miles distant. They should consist of groups of heavy mortars, having a range of five miles, placed in pits and under fire control of a single officer ; and they should be supplemented by outlying groups of detached mines and by a swarm of fast torpedo-boats. In general, the problem involves : 1. The effective range of modern high-power guns mounted on shipboard ; 2. The amount of damage they will probably inflict upon the port in question ; 3. What kind and amount of land fire, and what other expedients, will best produce the desired conviction that bombardment is inexpedient. Shaw lays down the extreme range of naval guns at 4.5 to 6 miles.

4460. Q. Discuss the relative advantages and disadvantages of high and low sites. A. The great advantage of a low site—to wit, ricochet fire—has been greatly modified by the introduction of

rifled guns and armored ships, whereas its disadvantages are that it affords no direct fire on the deck of a ship; permits the latter to dispense with high-angle fire, and places fort and ship on an equality as to energy of impact. A high site requires ships to use high-angle fire; makes the trajectories of their projectiles at short ranges more oblique still to the parapet; while the trajectories of projectiles fired against the ships are more nearly normal to the decks. They also compel the ships to keep a certain distance, owing to the limit of their angle of fire.

4461. Q. How does the height of a site exercise a controlling influence upon the mode of mounting and covering guns? A. The object sought is to combine the widest possible range and traverse with the least risk of being silenced by the enemy's fire; and, on account of the last-named, the kinds of mountings and protections used depend on the site. *For low sites* turrets and casements are required. *For heights of 300 or 400 feet* barbette batteries are used. *For intermediate heights*, especially for shoal water and mine-fields, disappearing-guns in barbette. *On cliffs 500 feet high*, which have great advantages, provision must be made to cover the dead-angle near shore (with a depression of  $7^{\circ}$ , which is about the maximum provided for, the dead-angle in front of a gun 200 feet above the water would cover 543 yards, and if 400 feet it would cover 1086 yards).

4462. Q. What are the limitations imposed by depth of water, rapidity of current, and tidal range on blocking the channel by submarine mines? How are excessive tidal ranges overcome? What is the admissible depth of water and rapidity of current? A. Shallow water, gentle currents, and small tidal ranges should have great weight in choosing sites. Practically, a depth of 100 feet, with a current of 7 feet per second, fixes the limit in which submarine mining in the United States is effective. Ten feet is about the maximum tidal range of any of its first-class harbors. Excessive tidal ranges (20 feet) can only be overcome by a double system of mines—one for low water and another, in rear of the first, for high water.

4463. Q. What are the general conditions that should be fulfilled by a system of channel obstructions by submarine mines? A. 1. The mines must be so arranged as to admit of the safe passage of a nation's own vessels, while they can be instantly rendered dangerous to the enemy. 2. This system must be automatic, the explosion occurring in consequence of the touch of the enemy; but it should also admit of frequent firing by groups when desired. 3. The mines should be so disposed as to cover a large area of the channel. 4. The system must provide electrical tests, so that the condition of every part may often be verified in detail, and also so arranged as to admit of repairs in case of need. 5. All of the mechanical arrangements of the mine must be simple, enduring, and strong enough to resist shocks from friendly vessels,

and from the explosion of neighboring mines; also, special precautions against twisting and undue depression by currents must be taken for all floating parts. 6. Every practicable auxiliary expedient should be adopted.

4464. Q. What is the nature of attacks on submarine mines that may be expected by daylight; by night or during a fog; and how should these attacks be met? A. *By daylight*.—Ships with outrigger frames or wire-rope crinoline may try to explode, at a safe distance, such mines as may be encountered. Meet this attack by delaying explosion until the torpedo has passed under her bottom. Finally, the crinoline will be swept away by the first explosion, leaving the ship exposed among other mines equally dangerous. If divers be sent forward to destroy the system, fire a mine in their vicinity; if old hulks steered by electricity, or drifting rafts with grapnels, switch off the batteries. Of course the guns of the forts will sweep the mine-zones when necessary. Abbot believes that the only successful method of attack will be by counter-mines. This will require steam-launches, controlled by electricity or otherwise, or small, heavily-armored vessels made for the purpose, to move up to the supposed outer limit of danger; plant from one to four 500-pound counter-mines; back off and explode them, to destroy any mines in the immediate vicinity. The vessels will then steam forward into the vortices, and place one or more buoys, and so on until the channel is clear. The fire from guns and mortars and the movable torpedoes will be used against such vessels, and at night new mines will be dropped in her buoyed channel. *By night or during fog*.—The attacks by night will be made by boats sent forward to do systematic mischief and place buoys. The best defense against such boat attacks would be by a flotilla of naval picket and torpedo-boats; but when they cannot be had, four useful auxiliaries may be employed, viz.: fouling-lines, automatic action of the guns, electric lights, and movable torpedoes under control from the shore.

4465. Q. What use is made of vertical fire? and mention some of the advantages of this kind of fire in seacoast defense. A. In coast defense, and sieges also, small mortars are now being adopted for field service. The blow is struck precisely where armor protection is least effective, and where shot and shell are most destructive in their effect. It cannot be silenced, even on land, when the mortars are properly covered. The greatly increased precision of modern vertical fire, owing to rifling, superior construction and mounting, range-finding, and the fact that mortars are cheaper than guns, renders it an exceedingly valuable ally, but not a substitute for the fire obtained from guns.

## EXPLOSIVES.

4466. Q. What is gunpowder, and what proportions of the several ingredients have been generally adopted as giving the best results? A. It is a very intimate mixture of nitre, charcoal, and sulphur. The proportions adopted are 75 parts of nitre, 15 parts of charcoal, and 10 parts of sulphur.

4467. Q. Enumerate the special powders used in the service of guns of different calibre in the United States Army, and explain the objects sought to be obtained thereby. A. Mammoth, Hexagonal, Sphero-hexagonal, I.K., and Brown Prismatic. The object sought is to regulate the rate of combustion so as to reduce the strains on the gun as much as possible, while at the same time preserving high initial velocity.

4468. Q. What is Cocoa, or Brown Prismatic Powder? How does it differ from ordinary gunpowder? What are the advantages claimed for this powder, and to what are they due? A. It is a powder in the form of perforated hexagonal prisms, cocoa-colored, introduced into Germany in 1882, which gives results superior in every respect to those obtained with ordinary cannon powders, from which it differs: 1. In the proportion of its ingredients; 2. In containing *brown* instead of *black* charcoal; 3. It burns much more slowly. The advantages are high initial velocity to the projectile, with relatively low pressures on the walls of the gun, and these are due: 1. To the form of the grain; 2. To the size of the grain; 3. To the great density of the grain; 4. To the hardness of the grain; 5. To the small percentage of sulphur; 6. To easy inflammability of the charcoal, or carbohydrates; 7. To the relatively great heat evolved; 8. To the simplicity of the chemical reaction.

4469. Q. Enumerate the properties of good gunpowder; state which property exercises the greatest influence upon the general character of the powder, and explain why. A. It should be composed of hard angular grains, which do not soil the fingers; of perfectly uniform dark-gray color, free from dust, and leaving no residue or foulness when a gramme is flashed on copper or porcelain, of the proper specific gravity; should not absorb more than .5 to 1.5% of moisture, and give the required initial velocity with not more than the maximum strain. Form and size of grain exercise the greatest influence, as they regulate the time of burning and hence the velocity of emission, and this governs the pressure. The density is also an important factor.

4470. Q. How is the specific gravity of gunpowder determined, and on what principle does this process depend? A. By means of the densimeter. The globe and nozzle having been carefully cleaned, the tip of the latter is immersed in the mercury, the lower stop-cock closed, all the others opened, and the air exhausted from the globe and tube by means of the air-pump. As

soon as the vacuum-gauge indicates a perfect (or nearly perfect) vacuum the lower stop-cock is opened, and as soon as the mercury, rising in the tube, becomes stationary, it is again closed. Air is then admitted to the top of the tube by opening the stop-cock attached to the catch-bottle. The other stop-cocks of the globe and tube are then closed, the globe disconnected, the nozzle removed, and all traces of mercury brushed off. The globe, filled with mercury, is then weighed and the weight noted ( $W$ ). The globe is cleaned, the sample of powder ( $w$ ) (at Artillery school 9 oz.) placed therein, and in operations just described the mercury raised to exactly the same point as before. The globe, containing powder and mercury, is weighed and the weight noted ( $W'$ ). Then:  $d$  = density of the sample of powder;  $D$  = density of mercury, corresponding to the temperature;  $w$ ,  $W$  and  $W'$ , as indicated;  $D : d :: W - (W' - w) : w$ . This depends on the principle that the specific gravities of two substances are proportional to the weights of equal volumes of those substances.

4471. Q. State the relative advantages and disadvantages in using potassium chlorate as a substitute for nitre in gunpowder. A. The advantage obtained in the superior explosive power fails to affect the danger attending manufacture, storage, and manipulation.

4472. Q. Explain the difference between an explosive mixture and an explosive compound. A. The former is merely the intimate mechanical mixture of certain ingredients, which can be again separated more or less completely by mechanical means, not involving chemical action. The latter is one in which chemical combination occurs so that each explosive molecule contains the combustible and supporter of combustion in closest possible union.

4473. Q. What is a nitro-substitution compound? Enumerate the more important explosives of this class that have been proposed for military purposes. A. One in which part of the hydrogen in the original compound is replaced by its equivalent of  $\text{NO}_2$ ; guncotton, nitro-glycerine, and their derivatives.

4474. Q. To what causes were the first unsuccessful efforts to make stable guncotton due? A. To the failure to purify the cotton perfectly; or to the use of weak acids; or to too short an immersion, so that the conversion was incomplete; or to the failure to remove the acids completely from the guncotton, due to the fact that the cotton-fibres were not cut up into short lengths. The improved process, due to Abel, consists in pulping the cotton after it has been immersed in the acids and washed.

4475. Q. Give an outline of Von Lenk's process of making guncotton. A. It consisted in: 1. The cleansing and perfect desiccation of the cotton; 2. The employment of the strongest acids, nitric and sulphuric, obtainable in commerce; 3. The steeping of

the cotton in a fresh strong mixture of acids after its first immersion and partial conversion into guncotton ; 4. The continuance of the steeping for 24 to 48 hours ; 5. The thorough purification of the guncotton, so produced, from every trace of free acid.

4476. Q. Enumerate the several service-tests by means of which the chemical character of guncotton is determined. A. 1. Determination of moisture in guncotton ; 2. Determination of ash of guncotton ; 3. Test for the pressure of free acid ; 4. Heat or stability test ; 5. Solubility test ; 6. Test for unconverted cotton ; 7. Test for nitrogen in guncotton ; 8. Determination of alkaline substances in guncotton.

4477. Q. How is finished guncotton prepared for testing? A. A disk or block of guncotton is split, and then, by gentle rasping or scraping, about 600 grains are removed from the centre of the mass. These are placed in a litre-flask, and a half litre of distilled water, at 39° C., poured upon it, after which the flask is covered and shaken violently for two or three minutes. Its contents are then filtered through muslin, and then, wrapped in the filter, subjected to a moderate pressure in a hand-press. This operation is repeated three times, when the sample is dried and taken out in the form of a cake, which is broken up into fine particles and rubbed between the hands. About 200 grains are then placed in a paper tray, which is placed upon the top of an oven heated to 120° F., care being taken that the tray does not come in contact with the walls of the oven. The mass is thus heated with constant stirring for fifteen minutes. When perfectly dry, the sample is transferred to a covered glass funnel with roughened sides, the neck of which is connected with a bellows through an ordinary aspirator-bottle. The mouth of the funnel is covered with a piece of muslin, and by means of the bellows the finest particles of the guncotton are blown to the sides of the funnel, from which they are carefully removed. After these particles have been exposed to the atmosphere of a normally dry and warm room for two hours, the sample is ready for testing.

4478. Q. Upon what principles do the heat, solubility, and nitrogen tests depend? A. *Heat*.—When potassium iodide is decomposed in the presence of starch, the iodide is liberated and reacts with the starch to form a colored body. *Solubility*.—The lower cellulose nitrates are soluble in a mixture of ether and alcohol, while the tri-nitro-cellulose is insoluble in such a mixture. *Nitrogen*.—When cellulose nitrates are treated with pure concentrated sulphuric acid in the presence of mercury, they are decomposed, all of the nitrogen being evolved in the form of nitrogen oxides.

4479. Q. Give an outline of Sobrero's process of making nitroglycerine. A. One half ounce of anhydrous glycerine is poured, with constant stirring, into a mixture of two ounces of concen-

trated sulphuric acid (sp. gr. 1.845) and one ounce of fuming nitric acid (sp. gr. 1.52), the temperature of the mixture being kept below  $24^{\circ}$  C. by external cooling with ice; and after the oily drops have formed on the surface the mixture is poured, with constant stirring, into fifty ounces of cold water. The nitro-glycerine will settle at the bottom of the vessel, so that the supernatant liquid may be decanted and the product purified by washing it with clean water, and drying it, in small portions, in a vapor-bath.

4480. Q. Give an outline of the French method of making nitro-glycerine as practised at Vouges. A. Two mixtures are first prepared—one a mixture of nitric and sulphuric acids in equal proportions, the other a mixture of one part of glycerine to 3.2 parts of sulphuric acid. These are thoroughly cooled and mixed together in the proportion of 5.6 parts of nitric-sulphuric mixture to 4.2 parts of sulpho-glycerine mixture. The whole is placed in an earthen pot, surrounded only by the atmosphere, and the operation is left to take place, which it does quietly, the nitro-glycerine separating as formed and rising to the surface of the liquid mass, from which it is eventually skimmed off, washed and purified.

4481. Q. How should frozen nitro-glycerine and dynamite be thawed? A. *Nitro-glycerine* may be conveniently and safely thawed by placing the vessel containing it in another containing water not hotter than  $100^{\circ}$  F. *Dynamite*.—The best way is to open the package and place it in a room where the temperature does not exceed  $212^{\circ}$  F. and allow it to thaw gradually. The next best way is to place the cartridges in a water-tight can (tin or copper), and place this can inside of another vessel containing boiling-hot (not boiling) water.

4482. Q. What is dynamite, and how may dynamite be classified? Give an example of each class. A. Dynamite is nitro-glycerine absorbed, and held through the force of capillarity by some porous, inexplusive substance, such as charcoal, paper, silica, etc. It is classified into: 1. Dynamites with an inert base; 2. Dynamites with an active base. Kieselguhr is of the first class. The second class is subdivided, according as the base is: 1. Combustible, like charcoal—carbo-dynamite; 2. An explosive mixture, chlorate or nitrate—dynamite No. 2; 3. An explosive compound—explosive gelatine.

4483. Q. Enumerate the principal characteristics of nitro-glycerine and dynamite. A. *Nitro-glycerine*, at ordinary temperatures, is an oily liquid (sp. gr. 1.6). Freshly made, by the Mowbray process, it is creamy white and opaque, but becomes transparent and nearly colorless. When produced by "skimming" it is transparent, but is often found in commerce to have a yellow or brownish-yellow color. Although slightly soluble in water it does not mix with it, and is unaffected by cold water. It has a sweet,



pungent, aromatic taste, and is an active poison. It is soluble in alcohol, benzine, carbon disulphide, ether, and chloroform, and sparingly so in glycerine, and is rapidly decomposed in alkaline sulphides. Freshly-made opaque nitro-glycerine freezes at from 3-5° F., while transparent freezes at 39-40° F.; in both cases to a white crystalline mass, and remains in that state even when exposed for some time to a temperature sensibly above its freezing-point. *Dynamite* is in a high degree insensible to shocks, and can be burned over a fire without exploding.

4484. Q. How may smokeless powders be classified? State the relative advantages and disadvantages of each class. A. 1st, those derived from picric acid and the picrates; 2d, those having ammonium nitrate as a principal constituent; 3d, those consisting essentially of nitro-cotton, or other kind of nitro-cellulose specially treated with the view of producing a slower-burning substance, or of nitro-glycerine and nitro-cotton. The advantages and disadvantages generally applicable to each class are: *Advantages*.—Approximate smokelessness, completeness of combustion, high and regular velocities with moderate and uniform pressures. *Disadvantages*.—The pressure acts along the walls of the gun, a lubricant is necessary, lacks stability under varying conditions of climate, etc.

4485. Q. Enumerate the precautions to be observed in handling, transporting, and storing high explosives. A. *Handling* should be done under the immediate supervision of persons thoroughly familiar with the proper methods to be pursued, and who will exercise great care and judgment. *Transportation* should be packed in light wooden boxes properly marked. On steamers, put them in a well-ventilated place remote from the engine. On railways, if the weather be hot, there should be good ventilation and ice in the car, so placed that water cannot reach the explosives. In winter protect it from freezing, if possible. Packing in straw or sawdust may be useful. Under no circumstances should cases of fuses be in the same car, or vicinity of the explosive. *Storage*.—At military posts, in ordinary service magazines, over which are erected light wooden roofs, so as to insure a draught of air during the hot summer. The usual precautions against fire and for storage of ordinary powder must be taken; and neither fuses, caps, nor detonators of any kind should ever be allowed in the magazine containing the explosives. Before being placed in the magazine the boxes should be given a coat of paint or shellac, to protect them from moisture. They should also be placed on skids, and the space between the skids partially filled with sawdust, to absorb any exuding nitro-glycerine. If any powder should be spilled on the floor or nitro-glycerine exude and be absorbed by the sawdust, it should be removed at once and burned. The boxes should be turned over every month or two, and if kept

long on hand they should be opened and the powder tested from time to time.

4486. Q. Explain briefly how to prepare a charge of high explosive to be fired by electricity—the precautions necessary as to the connecting-wires and the igniting-apparatus. A. Special care is taken that the fuse is deeply imbedded in the pinning-charge. Two lines are used, one known as the conducting-wire, which conducts the current to the point of application ; and the other, or return-wire, completes the circuit back to the igniter. Any good conductor, insulated or not, depending on circumstances, may be used. The best is a perfectly clean copper wire covered with india-rubber. The ends of the wire should be perfectly clean and joined to the fuse-wires by bending them back and twisting them snugly around each other. The other ends are attached to the igniter, the best kind being Laffin & Rand's Magneto No. 3. *Precautions.*—Never connect the fuse-wires with the connecting-wires until you are absolutely sure that the igniter ends of the connecting-wires are disconnected from the machine or battery. The connecting-wires should never be attached to the terminals until everything is in readiness for the blast.

4487. Q. Enumerate the conditions to be fulfilled by a military explosive. A. It must be powerful, insensible to the shock of projectiles, plastic, easily and safely exploded, and as stable as possible, so that it can be kept without alteration when in damp places.

4488. Q. Give a brief *résumé* of some of the principal experiments with a view of adopting high explosives as bursting charges for shells. A. *Guncotton.*—In 1864 an English committee experimented with dry long-staple guncotton, and most of the shots were successful. The experiments, three years later, with compressed-pulp guncotton were unsuccessful. In 1882 Germany made similar experiments, in order to determine the possibility of using large charges of guncotton in the 21-c. mortar. They were successful. In 1884 Commodore Folger, U. S. Navy, experimented with shells filled with guncotton saturated with water, a one-fourth inch layer of oakum being at the base of the shell. These experiments have since been continued at the U. S. Naval Ordnance Proving-grounds. It has been proved that it is possible to fire shell loaded with guncotton, wet or dry, from the ordinary powder-guns using service charges under service conditions. *Nitro-glycerine.*—In 1885 unsatisfactory experiments were made with a shell wherein the bursting-charge of nitro-glycerine was made during the flight of the projectile, and fired upon impact. In 1887 Smolianinoff's secret method, whereby the nitro-glycerine was first rendered insensible by treating it with a liquid, was successfully tried at the Torpedo Station, and also at the U. S. Ordnance Proving-grounds. *Dynamite.*—Experiments were made with dynamite in 1867 in Sweden, 1870-71 in Germany, 1874 at

the U. S. Torpedo Station, and in 1886 with the Graydon shell; and it was found that it could be fired with small charges of powder. *Explosive Gelatine*.—The U. S. Ordnance Board made unsuccessful experiments with it in 1883. *Hellinite*.—The Gurney experiments with it were successful; but it is not so good as guncotton. *Mellinite*.—Recent experiments with it by the French authorities have been highly successful.

## GUNNERY.

4489. Q. Name and describe briefly the gauge used to determine powder-pressure in a gun. A. The *Crusher-gauge*. It consists of a removable steel cylinder, of the same diameter as a vent-bush, having an interior chamber. A nozzle containing a piston screws into the inner end. A copper disk (.5 in. long,  $\frac{1}{4}$  sq. in. in sectional area), which is lightly held in the middle of the chamber by a piece of watch-spring, permitting free lateral expansion, is first placed in the cylinder. The nozzle containing the piston is then screwed in, and a small brass cup is put below the piston to act as a gas-check. After the discharge of the piece, the amount of compression of the disk is measured with a micrometer, and the corresponding pressure obtained from the reference-table. The hard-steel anvil is no longer used with this instrument.

4490. Q. What is the usual basis of comparison of guns with each other? A. The amount of *work* producible with safety *per ton weight of gun*.

4491. Q. State the advantages of rifled over smooth-bore guns. A. Greater accuracy, increased range, greater energy, bursting-charges of shell increased, better penetration, simpler-range tables, action of percussion-fuse simplified.

4492. Q. How can greater energy be obtained from a gun without increase of calibre? A. By improvements in the strength of the gun, longer bores, and higher charges of slower powder.

4493. Q. Define steel. A. Steel is an alloy of iron, cast, while in a fluid state, into a malleable ingot.

4494. Q. What is the distinction between mild or low steel and high steel? A. The distinction is in the amount of carbon, mild steel containing *less* than high steel. The former is used for guns, the latter for tools, etc.

4495. Q. What in general is the effect on the elastic limit, tenacity, and elongation of an increase of carbon in steel? A. Small differences in the proportion of carbon make very great differences in the elasticity, tenacity, hardness, and elongation; the first three being *increased*, and the fourth *decreased*, before fracture.

4496. Q. What kind of steel, with respect to carbon, is used for

gun-forgings? A. That containing about 0.25 to 0.5 percentage of carbon.

4497. Q. Describe briefly the crucible process of making steel. A. Carefully weighed proportions of wrought-iron (with sometimes a little steel or good cast-iron of known composition), powdered charcoal, and spiegeleisen are placed in a crucible capable of holding 60–100 lbs. A number of such crucibles, fitted with fire-clay covers, are placed in a specially constructed furnace, and subjected to a high degree of temperature for  $2\frac{1}{2}$  to 3 hours, after which their melted contents are poured into the same ingot mould as rapidly as possible. The carbon alloys with the iron to form steel, and the manganese in the spiegeleisen reduces any ferrous oxide present. The liquid clay which forms on top and the cover prevent oxidation.

4498. Q. Describe briefly the open-hearth process of making steel. A. The hearth is spoon-shaped, sloping down to a point where the tapping-hole is situated, and covered with partly-fused sand. Good cast iron is placed therein, and subjected to the heat and flame of the low-roofed reverberatory furnace. When the iron is sufficiently fluid, steel-scrap or wrought-iron, previously warmed by the waste heat, is thrown in, and when well melted down a further reduction in carbon is obtained by the addition of known quantities of good Spanish hæmatite ore. During the process then occurring, termed boiling, tests are made and ore or iron added until the desired conditions obtain. Just before pouring out, the addition of the proper quantity of speigeleisen, or ferro-manganese, is made. This is previously heated, and scattered over and stirred up in the steel, and after its thorough incorporation two spoon-tests are taken, the tap-hole opened, and the steel run into a warmed large iron ladle lined with fire-clay, and the ladle, by means of a powerful crane, is carried to the ingot mould, to which the steel is transferred. Sometimes the steel is run into the mould without the use of the ladle.

4499. Q. Describe briefly the Bessemer process of making steel. A. The steel is made in an egg-shaped iron receptacle, called a converter, revolving on trunnions, one of which has teeth to work in a gearing for turning it up or down, while the other is hollow to admit of the passage of a pipe that communicates with a large number of small holes fitted in the fire-bricks in the bottom of the vessel, and through which a powerful blast of air is forced. The converter is also provided with a short chimney on top, and is lined with a very refractory material called gamster. In order to make the steel, the converter is turned down, melted cast-iron poured in until it is one eighth full, the blast turned on, and the converter turned up. When the flame indicates to the eye, by certain spectroscopic lines, that the proper moment has arrived, manganese is added, the "blow" continued for less

than a minute, and then the steel is run off and cast into an ingot, the same as in the open-hearth process.

4500. Q. State how a steel ingot is forged. A. It is reheated, carefully inspected, cracks cut out, and either hammered, rolled, or pressed to the required shape, great care being taken about the temperature.

4501. Q. State how a steel ingot, after forging, is tempered, and discuss the effect of tempering on the forging. A. The ingot is subjected to a certain degree of heat, and then slowly cooled, generally in rape-oil. Tempering, which varies with the amount of carbon in the steel, the temperature, and the nature of the cooling material, increases the tenacity and elasticity at the expense of the elongation before fracture. As it alters the specific gravity slightly, often producing warping and surface-cracks in large masses, the effect is sometimes modified by afterwards heating the mass in boiling tallow for several days, and then allowing it to cool slowly.

4502. Q. State the general advantages of a wire gun. A. The tension of the wire can be well adjusted in winding on, and, as it is thin and wound many times, each part can be strained almost to its elastic limit on firing; if flaws exist, they can generally be detected, and steel in the form of wire can be made to have the greatest elastic limit of any known material. The wire, however, does not give any assistance for longitudinal strength.

4503. Q. Explain how the longitudinal tension in a built-up gun is provided for. A. By firmly locking the parts together and placing the breech mechanism in the jacket.

4504. Q. How have the contour-lines of a gun been changed by the adoption of slow-burning powders yielding only moderate pressures? A. The guns are made longer, the metal at the breech reduced, and at the muzzle increased, so that the line is longer and flatter.

4505. Q. What mechanical precautions must be taken in making the grooves in rifles? A. To make a smooth, unbroken surface, devoid of small cracks and tool-marks, numerous shallow and rounded grooves are to be preferred.

4506. Q. What is the difference between a uniform twist and an increasing twist of rifling? A. Uniform twist imparts angular velocity to the projectile very rapidly at first, but adds little to it during the latter part of its passage down the bore. Increasing twist gives rotation gradually, with nearly uniform pressure. A combination is now used, the part nearest the muzzle being uniform.

4507. Q. What is the vent of a gun, and in general how are vents placed? A. The opening, which must exist in the chamber of the gun for communicating fire to the charge. Vents may be radial or axial; the former entering the bore at right angles, or nearly so, to the axis of the gun, and either forward, 4 of the

length of the cartridge from its front end, or rear, near the junction of the cylindrical part of the chamber with the flat end of the bore. The latter is in prolongation of the axis.

4508. What are the form and dimensions of the chamber of a high-power gun? A. It is cylindrical and considerably larger than the bore.

4509. Q. Give the calibres of B. L. cannon of the mountain, field, siege, and seacoast artillery, U. S. Army, and what you remember in regard to the weight of pieces, weight and kind of powder-charge, weight of projectile for each piece; also, what you remember in regard to the energy and penetration in steel armor at the muzzle for each piece of the siege and seacoast artillery. A.:—

Calibre. Inches.	Kind.	Weight. Lbs.	Powder-charge.		Weight of Projectile. Lbs.	At the Muzzle.	
			Wt. Lbs.	Kind.		Energy. Foot- tons.	Penetr.* Inches.
1.65 3	{ Hotchkiss rifle, steel.	121	5.5 oz.	Mortar.	1.95		
		218	14 oz.	I.K.	12		
3.2	Rifle, st., mod. '85	829	3.5	Sph.-hex.	13.5		
3.2	" " " '90	805	3.5	"	13.5		
3.6	Rifle, steel.	1181	4 $\frac{3}{8}$	"	20		
3.6	Mortar, steel.	244	15 oz.	"	20		
5	Rifle, steel	3660	12.5	Sph.-hex.	45	1045	6.2
7	Howitzer, steel.	3710	10	I.K.	105	856.9	3.8
7	Mortar, "	1732	5.5	—	125	412.5	2.2
		Tons.					
8	Rifle, steel.	14.5	125	Brown pris.	300	7907.5	16
10	" "	30	250	"	575	15548	20.4
12	Model, 1888.	52	450	"	1000	27040	20.9
12	" 1891.	57	520	"	1000	30570	27.1
16	Rifle, steel.	125	1060	"	2370	64084	33.8
12	Mortar, cast-iron, hooped with steel.	14.25	80	"	{ 800 1000+	5769.7	8.2
12	Mortar, steel.	13	105	"	{ 800 1000+	7206.9	9.7

\* In steel armor.

† This shell is used for a range up to 2½ miles, with reduced charges.

4510. Q. What, briefly, is the French fermature, and in which B. L. U. S. Army guns is this fermature used? A. It consists in field and siege guns, principally of a breech-block and a carrier-ring. In larger guns the carrier-ring is replaced by a tray, or console. The interrupted screw is used to lock the block in the firing position. The other parts are the spindle, the obturator, the lever, the fixed handle, the hinge-pin, the latch-pin, and stops. It is used in all field, siege, and seacoast guns.

4511. Give a brief description of the De Bauge gas-check. A. It consists of a compressed pad of asbestos and tallow encased in canvas enclosed between two steel plates, acted on by a circular steel block with mushroom head at the end of the bore. The head of the spindle, which passes through the breech-block, is mushroom-shaped.

4512. Q. What are the trunnions, and what is their use? A. They are cylindrical projections on either side of the gun, having a common axis perpendicular to and intersecting the axis of the gun at a point a little way in front of the centre of gravity of the gun. They give means of support to the gun, transmit shock of discharge to the carriage, and allow of easy alteration in the elevation of the piece.

4513. Q. When a gun is too large to be mounted on trunnions, how is it mounted? A. It is rigidly attached to its carriage.

4514. Q. Explain the general principles of pointing a gun. A. Giving the proper direction, by traversing; the proper elevation, depending on the distance of the object; allowing for drift and wind; and when the wheels, as in the case of field-guns, are not on the same level and compensating sights are not used, making the necessary correction.

4515. Q. Explain the "indirect system of pointing," and give a brief illustration. A. The method pursued when the target cannot be directly seen from the gun. The German cupola, in which is a small hole near the top, at the opposite side to the muzzle of the piece, permitted obtaining direction through the hole. The cupola was then revolved exactly  $180^\circ$ , elevation obtained by means of the quadrant, and the gun fired. Also, see Dyer's method of pointing mortars.

4516. Q. Explain briefly any method by which a garrison gun may be pointed at a hidden target. A. By using a depression-range and position-finder in electric communication with the battery, where is placed an indicating-instrument, which automatically records the range and direction of the ship from each group of guns. The range and direction are given by means of the elevating-arcs and graduated arcs on the traverse-circle.

4517. Q. What is the jump of a gun? A. It is the angle between the line of departure and the axis of the piece before firing, caused by the blow on the elevating-gear produced by the friction of the trunnion against its bearing.

4518. Q. How does the weight of a gun and carriage affect the recoil? A. The recoil diminishes as the weight of the gun and carriage are increased.

4519. Q. State briefly in how many ways the recoil of guns may be controlled. A. By raising a weight; by the friction of solids; by the resistance of liquids; by the resistance of the air.

4520. Q. What is meant by the blast of a gun, and what is the

effect on embrasures? A. The long flash from the muzzle and the rapid rush of the powder-gas. The effect on embrasures is very destructive.

4521. Q. What are the chief causes of inaccuracy of fire? A. Want of accuracy in the gun; variation in the mounting and drift; want of uniformity in the ammunition; errors in laying; external causes, such as wind.

4522. Q. What is a range-finder? Describe briefly the features of any range-finder you are familiar with. A. A range-finder is an instrument used for determining the range. They generally depend on the principle of the solution of the right-angled triangle. The Berdan, consisting of two telescopes mounted at the extremities of a fixed base, one being at right angles to the base, and the other so connected with a drum that when brought on the object the range is read directly from the drum.

4523. Q. What is ricochet-fire, and when is it used? A. It is the fire in which the projectile is so fired that it will bound along the surface of the ground. It was employed with smooth bores for dismounting guns behind traverses; but with rifle projectiles it is very uncertain. With considerable angles of descent there is no ricochet, hence it is not used at long ranges.

4524. Q. Explain the Rodman system of obtaining initial tension in cast-iron guns. A. Rodman cooled his guns from the interior, thereby introducing a strain of compression upon the interior layers of the gun, such that each one of the indefinitely thin cylinders composing the thickness of the gun should be brought to the breaking-strain at the same instant. Practically, this desired initial tension could not be produced with any degree of certainty.

4525. Q. What three different methods have been used for converting the Rodman S. B. into M. L. R.? A. 1. The muzzle insertion with wrought-iron tube; 2. The breech insertion with wrought-iron tube; 3. The muzzle insertion with steel tube.

4526. Q. What are the advantages claimed for the multi-charge gun? A. Very high velocity, with low pressures. This gun is built on the accelerating principle as applied to the action of the powder upon the projectile.

4527. Q. Describe the friction-primer used in the B. L. sea-coast guns, and explain how the obturation of the powder-gas is effected. A. The case is made of hard-rolled brass, reduced at one end to form the shank, or part containing the powder-charge. The middle portion, or body, is chased with a screw-thread, either entire or interrupted, while the other extremity, or head, is flattened so that a wrench may be used when required, either in inserting the primer or extracting it after firing; and it is ignited by a serrated wire acting upon friction composition. The gas-check is either at the top of the shank, with a brass plug in the



primer to act as gas-check, or the metal at the mouth of the shank is made thin enough to act as a gas-check.

4528. Q. Describe the electric-primer used in the B. L. sea-coast guns, and explain how the obturation of the powder-gas is effected. A. It consists of a shank, body, and head, as described in 4527, and is ignited by a platinum wire in an electric circuit, the wire being wrapped in guncotton. It contains an insulating-block, which is driven against a sharp-edged ring, in order to stop the flow of gas.

4529. Q. Why is the forged ingot annealed before tempering, and how is the annealing effected? A. In order to get rid of the internal tensions induced by forging, thereby avoiding cracks. It is effected by heating the ingot to a red heat and allowing it to cool slowly.

4530. What is the effect of oil-tempering and annealing upon the physical properties of steel? A. Oil-tempering increases the homogeneity of medium steel, and also increases its resistance to percussion; or it increases the elastic and tensile strength and reduces the elongation. Annealing reduces the elastic strength and restores the ductility.

4531. Q. How are the physical properties of metals determined? A. By subjecting specimens to the action of different stresses in testing-machines, and observing the effect on the specimens in alteration of volume and figure by means of accurate measuring-instruments.

4532. Q. What is a high-power gun? A. A gun with which the attainable velocity is 2000 f.s. and upward.

4533. Q. What are the advantages of breech-loading? A. Increase in diameter of powder-chamber; rapidity of fire; less exposure; decrease of labor in loading; safety in loading; accuracy of fire; increased muzzle velocity; reduction in depth of rifling; facility for examination of the bore.

4534. Q. Explain the principles of "initial tension." A. "Initial tension" consists in giving to the exterior portion of a gun a certain permanent tension gradually decreasing toward the exterior, and giving to the interior part a certain normal state of compression by the grip of the outer cylinder and coils. The compression of the interior within the elastic limit must then first be overcome before the powder-gas can exert a tension on the interior tube.

4535. Q. Explain "shrinkage." A. The inner diameter of the outside tube, when cool, must be a little smaller than the outer diameter of the inside tube. This difference of diameters is called shrinkage, and is equal to the compression of the inner plus the extension of the outer tube when assembled.

4536. Q. Explain the "heat" used for shrinkage. A. The heat used is not very great, the temperature not being over 600° for wrought-iron and steel. Increased temperature is of no conse-

quence, provided it is not raised high enough to form scales on the surface of the metal; and in all cases the interior of the coil to be shrunk on must be swept clear of ashes, etc., when it is withdrawn from the fire.

4537. Q. Give the general features of a built-up gun. A. It consists of a steel tube in one piece, extending the whole length of the bore; a jacket, shrunk over the tube, from the breech-end, and extending two fifths of the tube; a layer of steel hoops shrunk over the jacket; tapeing and locking-hoops, the chase-hoops extending to the muzzle in all calibres excepting the 5-inch gun. A trunnion-hoop, which serves to lock the parts together, is placed in position so as to give no preponderance in all calibres up to and including 12-inch guns. The heavier calibres have no trunnions, the hoops over the forward ends being so shaped as to allow the gun to rest in a saddle. A narrow hoop is placed around the gun outside of all in rear of the trunnions for the larger guns, to which is attached the elevating-arc.

4538. Q. Explain how the parts of a built-up gun are assembled. A. The parts are received rough-bored, and turned. They are then turned and bored with the greatest accuracy to the necessary size for final assembling. The jacket is bored out and finished on the interior, and the portion of the tube over which it is to fit is then turned down to diameters corresponding to those on the interior of the jacket plus the shrinkage between the tube and the jacket. The tube is then placed, muzzle down, in the shrinking-pit on heavy blocks (from which extends a stout iron bar up through the bore and some distance beyond the breech), so that the forward end of the jacket when in place will come a little above the floor of the foundry. At the level of the floor is built a water-tight dam, surrounding the tube, and about two feet deep, or the water is applied by means of a ring of water-pipe full of holes. The jacket is then expanded by heating it in a sheet-iron cylinder with a light wood-fire, heaping on the wood until the embers cover the entire jacket. At intervals these are brushed aside and the jacket calipered. When it has expanded sufficiently a sling-band is put on with set screws, the crane is hooked on, and the jacket is swung over and lowered into place on the tube; when nearly in its seat the chain of the crane is let go, and the jacket falls five or six inches, thus setting it up hard on the shoulders. A crossbar is then placed over the breech, the rod through the bore is attached to the crossbar by means of a nut and screw, and the jacket is then held firmly in place. At the same time water is put in the dam around the forward end of the jacket, ice being added to keep the temperature down. In this way the jacket is made to nip at its forward end, so that all further contraction is toward this point. The exterior of the jacket and also of the tube is prepared for the reception of the hoops by being accurately turned in a lathe to

the finished diameter of the hoops at the several points *plus the shrinkage at those points*. The hoops are shrunk on with the gun horizontal, working from the trunnions each way; the hoops being cooled first at the shoulders, or at points of contact with the preceding hoop, until only the trunnion-band remains. This piece is screwed on cold on navy guns and shrunk on the army guns. The narrow band around the cylinder of the gun to which the elevating gear is attached is shrunk on after the gun is otherwise complete.

4539. Q. How is the rifling of a gun accomplished? A. The gun is placed on a planing-machine and rests in collars, so that it can be given a motion of rotation as each cut is made. The rifling-bar is set in a horizontal position in the prolongation of the axis of the bore, and is so secured that it has no motion of translation. The curve of rifling is cut on the bar in the shape of a slot. Just in front of the muzzle of the gun the bar passes through a support resting on the planer-bed, in which there is a stud which moves in a slot on the bar. As the gun moves forward and backward with the bed of the planer, the rifling-bar is made to revolve by means of the stud in the rifle-support and the slot in the bar, so that the cutter on the end of the bar reproduces the curve of rifling in the bore of the gun. Cutter-heads have been designed to cut four or eight grooves at one operation. As each cut is finished the gun is turned on its supports. The rifling of guns for the Navy is done as above described; but in the manufacture of guns for the Army a special machine for rifling is used, the bar of which has a motion of translation and also of rotation, the gun remaining fixed.

4540. Q. What are the requirements of a breech mechanism? A. 1. It must completely stop all escape of gas to the rear; 2. It should not weaken the gun; 3. It should not be easily put out of order; 4. All parts exposed to wear should be capable of being readily and easily replaced; 5. The obturation should be automatic, and the greater the pressure the more complete the closing of the mechanism against the escape of gas to the rear.

4541. Q. Define a rapid-fire gun, and give an example. A. A single-shot breech-loading gun, using fixed ammunition, capable of firing several shots a minute—the Hotchkiss Rapid-fire Gun.

4542. Q. Define a machine-gun, and give an example. A. A gun loaded and fired by machinery—the Gatling.

4543. Q. What are the different kinds of projectiles and their uses? A. Shot, shell, and shrapnel. Also, rifled canister. Shot are used for racking or punching. Shell are of two kinds, battering and ordinary. The former are cast or forged with a solid head, and have no fuse, ignition for bursting-charge being effected by the heat of impact. The latter have a fuse fitted in either head or base. Shot and shell are used against *matériel*; shrapnel and canister against *personnel*.

4544. Q. What are "armor-piercing shells," and how may they be tempered? A. They are made of forged or rolled tempered steel. They are first treated to a cherry red throughout, then plunged in oil and kept immersed until cold. They are again heated to a cherry red, and are hung with the head, as far as the front band, in cold water, kept eight or ten minutes, and then wholly immersed in oil until cold.

4545. Q. How are common shell cast? A. They are cast point-down in flasks of iron lined with sand, with a core of sand formed on a hollow iron spindle for shell. In recent castings at Washington the position has been reversed, in order to obtain sufficient density at the base to withstand the modern high pressures.

4546. Q. Explain how rotation is given to a projectile. A. Bands of soft metal, brass, copper, or composition are firmly attached to the projectile, and either by expansion or compression, by the action of the powder-gas, are forced to take the grooves. The stud system is used, and also the Whitworth, but not by the United States.

4547. Q. What is the relative penetration of steel armor as compared with wrought-iron by the same projectile with the same striking velocity? A. Roughly speaking, with compound or steel armor the penetration is about two thirds that in wrought-iron.

4548. Q. Give the rules for the attack of armored ships. A. 1. *Against iron armor.* The projectile must have at least 1000 feet striking velocity for each calibre in thickness of armor. Steel-forged armor piercing-shells, unfilled, should be used when perforation is to be attempted, unless the guns are of very high power compared to the armor. Steel-filled shells or drilled iron-filled shells are useless against thick armor. 2. *Against steel or compound armor.* The chance of penetration by a single blow is small, but continued fire may break up the armor. This armor must be fractured. 3. *Against wrought-iron armor.* This must be penetrated, and is effected by the power of the gun for penetration. When ships are at anchor, or steaming in a narrow channel, high-angle fire from rifled mortars to penetrate the decks will be used. In all cases the guns incapable of doing the primary work indicated would be used against the tops, exposed guns, and unarmored parts.

4549. Q. In the destruction of armor, what is the difference between "punching" and "racking"? A. *Punching* is the distribution of the blow over a small area. An elongated projectile moving with high velocity is used, the object being to pierce a hole through the target. *Racking* is the distribution of the blow over a large area, by large spherical projectiles, the object being to rack or shake the target to pieces.

4550. Q. What is the Orde-Brown rule of thumb for the pene-

tration of armor? A. One calibre for every thousand feet of velocity.

4551. What is the best weight for a projectile of given diameter? A. 4.6 times the cube of the radius in inches. (Also

$\frac{W}{d^3} = .45 \text{ to } .5$ ,  $d$  being diameter, is a rule.) .



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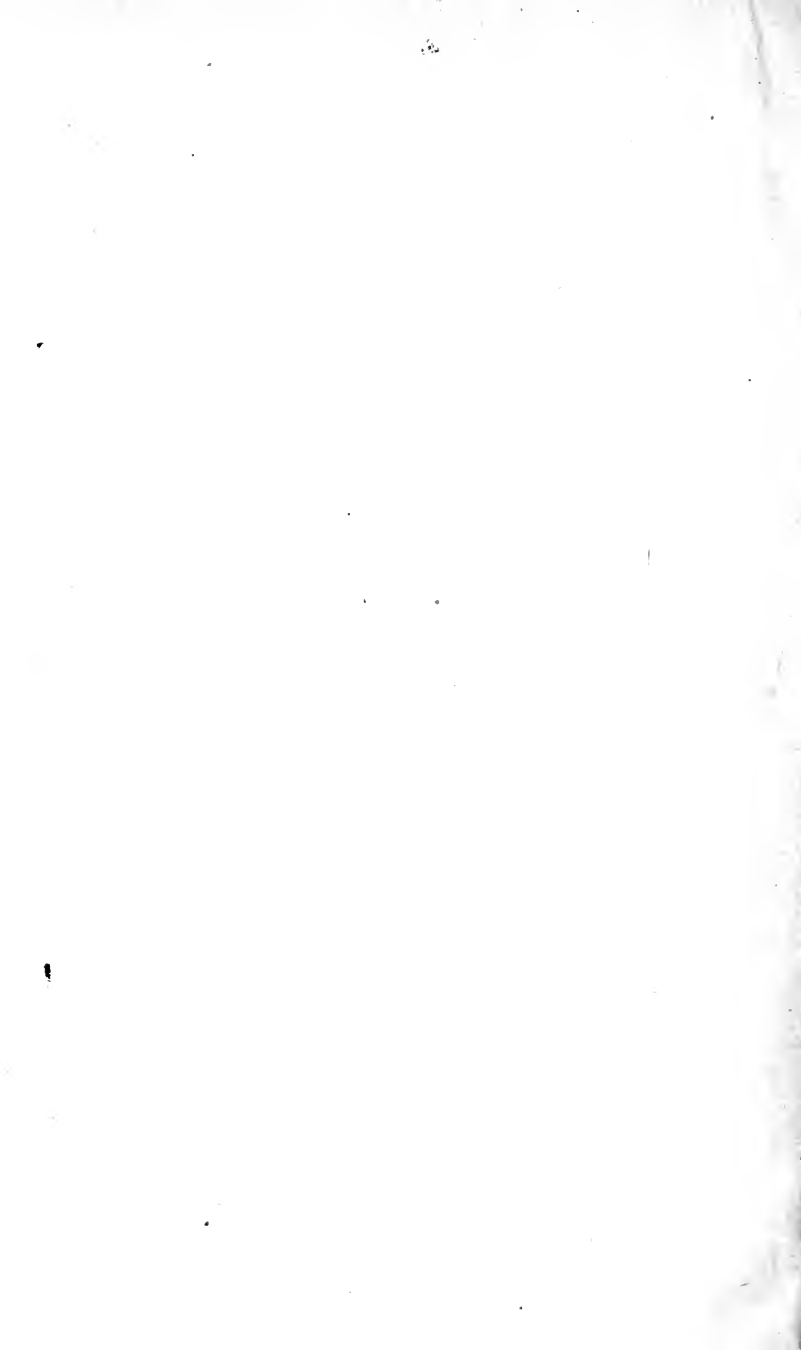
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